Kas Oosterhuis
E-motive Architecture
A conversation with Marlon, Virtual Friend
Kas Oosterhuis
E-motive Architecture

Inaugural speech delivered on November 7th 2001 on receiving the chair of Architectural Design at the Faculty of Architecture, Delft University of Technology
Rector Magnificus, members of the Board, fellow professors and other members of the universitarian community, highly esteemed listeners, ladies and gentlemen, please lean back, relax and get ready for e-motive architecture.

Hey Kaas, just look at you, what are you dressed up for?

I see I see, well, go ahead Mr Owsterhuys.

Hey Kaas, what are you saying, is a building some sort of machine?

What sort of information are you referring to?

(doi the Dutch honours) Mijnheer de Rector Magnificus, leden van het College van Bestuur, collegae hoogleraren en andere leden van de universitaire gemeenschap, zeer gewaardeerde toehoorders, dames en heren, maakt u zich gereed voor e-motive architecture.

Virtual friend, I'm wearing black because today I'm representing knowledge. Today I know how things are, tomorrow I'll get back to reflecting again.

In the coming half-hour I shall be presenting a number of firm beliefs which form the basis of my research at the faculty of architecture and of the practice of our firm ONL. The work our firm does can readily be described as the electronic fusion of art and architecture. One department, ONL_art, is led by my partner, visual artist Ilona Lenaard, while I myself am in charge of ONL_architecture and ONL_media. For the faculty I have launched the Hyperbody Research Group, one of whose aims is to actively position our ideas on intuitive, immediate, real time architecture in the international architectural discourse.

Buildings are information-processing vehicles.

Body building garbage transfer station Elhorst/Vloedbelt, Kas Oosterhuis 1994

According to my working definition, a building is a set of fixed and moving components, a totality giving form and substance to the flow of information passing through it. The moving parts are the doors, windows, switches. Actually the doors are switches too, they are either on or off, open or closed. When they are open they let through information, when closed the flow of information is obstructed.

I'm talking about information in whatever guise: image, text, the spoken word, electricity, water, gas, commodities, air, light. Every form of information has its own carrier. People convey spoken language, books convey the printed word, television conveys images, tubes and ducts convey gas, air and light. Information is continually on the move, information is like a package with no fixed residence or place of belonging. Buildings absorb the incoming information, process that information and release it in another form. Buildings have their own form of metabolism.
So Kaas, what you are actually saying right here and now is that a building is a sort of body?

Sure, architecture is an information carrier. And I bet we humans are all information carriers too, aren't we?

... And what sort of vehicle are you personally, Kaas? And your wife E-iona, what stuff is she made of?

Yes, buildings are bodies, buildings are building bodies with a head, a trunk and a tail such as the Elhorst-Vloedbelt garbage transfer station I built in 1995. This building is a rubbish-sorting machine. Here I have regarded waste matter as a particular form of information: it's weighed, rolled, sorted, stored, filtered, cleaned. The building gets this process in order while the building's architecture communicates the process internally and externally. So that the architecture can itself be regarded as an information-processing vehicle, an input-output device.

We hear, see, smell, feel, taste, we process the information in our brains and other organs, in turn producing images and sound and leaving other processed matter behind. We are metabolists by nature. Information is always subject to a continuous process of transformation. In that process there's a moment when the information is carried by a vehicle. When, for example, we drive a car, the car carries the luggage and the driver, both of which carry information. At the same time the driver carries information of the driver that she has stored as well as the information that he/she processes in real time. The information produced during the process of driving a car consists of signals sent out by the car to other vehicles: speed, direction, indicator, brake light, sound of the horn etc. Now if we apply this manner of observing to buildings and architecture, then we can establish that buildings are continually absorbing information, processing it and then producing new information. All buildings together play an important evolutionary role in the worldwide process of transforming information.

Looking at our own genetic background, I can describe it in two ways: as the genetic product of our parents but also as the informative product of the work they did, of the ideas and things they generated. None of our parents is still alive, but their thoughts and their work may enter and re-enter our metabolism at any time. Every thought is an active construct in real time, history is rewritten every time I think. Seen in this light, memory and history are persistently active components in real time evolution. As information-processing vehicles we are being continually bombarded with information from inside — driven by the genetic code as prefabricated by our parents — and from outside — the context in which we as metabolic vehicles roam.

E-motive architecture produces the hyperbody.
Marion, Virtual Friend

Sounds good as a one-liner, and I can understand that you draw the parallel between yourself as an information-processing vehicle and the concept of architecture as an information-processing vehicle, but how can we work with that as designers? What is a fucking hyperbody? Are we talking architecture at all?

Kas Oosterhuis

A hyperbody is a programmable building body that changes its shape and content in real time. This definition needs explaining in greater detail. So I'll lay it on you one word at a time. A hyperbody is to architecture what hypertext is to written information. A hypertext is saturated with warp holes, you can jump from one universe to the next in a fraction of a second. It will soon be made clear to you how warp holes can be introduced into buildings. A hyperbody is a building body. A building can only go hyper if it has a body. This building body is the vehicle for processing information. Information which has been dragged in by the user, and information fed into the building body by way of the umbilical cord.

A hyperbody is a programmable building body. The building body is now programmable. We are seeing this process take place under our very eyes. Take a good look around and you'll see what I mean. Within the last ten, twenty years it has become possible to measure and adjust the services in buildings by remote control. Buildings themselves have been measuring their temperature and humidity in real time since time immemorial. Architects have just never got round to actively deploying these techniques in the design process.

The agenda is still dictated by a monocultural monopoly of the ideal climate. Everyone knows that such a thing doesn't exist and yet it is accepted without protest as an incontrovertible given. A programmable building has no such givens. It is programmable, which means that you can create it whatever climate you desire. It also means that architects can design experiences and that users can evoke experiences with their own particular climates. A hyperbody is a programmable building body that changes. Until now architecture was a discipline of intractability. Buildings were always meant to be as steady as a rock and give shape to the flow and, more importantly, resist that flow. Let's imagine that buildings could move with changes in use, more so than was considered possible before now, that they could move with changing conditions. Then architecture would become dynamic. And I'm talking about more than just moving windows and doors. Here it's about the entire building. Architecture would be able to move. A hyperbody is a programmable building body that changes in real time. Nor am I talking about animation in the design process, but about animated buildings. Buildings that are continually calculating, persistently fixing their position with regard to other real time processes in and around them. I'm thinking about building parts that fix their position with regard to other parts of the same building. Rather like an arm and the opposite leg balancing each other out. The building's components are a swarm of elements that can function individually but still belong to the same swarm. A hyperbody is a programmable building body that changes its shape in real time. I'm assuming that the building's structure will become programmable. Until now designing the structure has always been aimed at resisting distortion. The most fantastic distortion diagrams are drawn up so that heaven and earth can be moved to rule out all distortion, and
thus the beauty of distortion. A programmable structure never stops calculating, it keeps on fixing its position to preserve its balance or indeed to lose it, to relax or to brace itself. A real time building body is always doing something. A hyperbody is a programmable building body that changes its shape and content in real time. Real time building bodies feed on information, they process information and then separate it again. That information of course travels as hypertext does, via warp holes from one universe to another. When this information settles in the hyperbodies as a hypersurface, then our perception of the spaces in and around the hyperbody can be programmed and driven and is therefore a subject for design. Architecture becomes a game and the users the players. Architects are the programmers of this game.

Now that we have a workable definition of a hyperbody, it's high time that we looked to see if such hyperbodies already exist somewhere in a rudimentary form. And then, what might a full-blown hyperbody look like? What evolutionary leaps forward can we expect in the next, say, ten to twenty years? And what, in this context, is the subtle difference between building and architecture? And for the field of architectonic design we have to ask the important question of what needs developing at the architecture faculty so that we can work on hyperbody research at an international level.

Too many questions, my virtual friend, so perhaps the sensible thing for me to do is first explain my perception of real time evolution. The thing is, I feel that Darwin's standard opus has led us up the garden path. In his book he exclusively discusses old nature, pre-nature. He leaves aside entirely the fascinating evolution of thoughts, instruments and processes at present proceeding at full tilt. And this is symptomatic of almost every study on evolution. Even Kevin Kelly barely gets round to the subject in his masterwork Out Of Control. In my opinion the only way to get a deeper insight into the matter is to study the current evolutionary output in its entirety and then conduct evolution as a process in real time. Evolution is a process that happens. Evolution is something one does. Let me give you an example from the car industry. When I see the headlamp of a new model, say the new Peugeot 206, then I place that headlamp in the light of the development undergone by headlamps in the past century, I try to imagine how the information flow has proceeded so as to arrive at that design, and then try to extrapolate how the evolution of headlamps will continue in the future. My diagnosis, then, is that the headlamp that has actively ensconced itself in the car body in the last few decades will evolve further from a tack-on element that converts electricity into light, into a kind of eye, a information-processing organ. The headlamp will evolve into an input-output device. An appliance that absorbs internal and external information, interprets it and generates new information. Headlamps will become real time instruments that can take account of other organs in the car body, and of the context in which they find themselves.

And architecture? What is the relationship with architecture?
motive architecture is to be honoured. I would like now to show you my project Trans-ports which I embarked upon three years ago and that constitutes an initial step towards the paradigm shift from frozen architecture to architecture in real time. The idea for Trans-ports grew out of a discussion I had with Marcos Novak in 1999 in Los Angeles at a conference in the Getty Museum. The initial concept was to link together the spaces in different port cities using wideband Internet. The spaces in Rotterdam, Los Angeles and Tokyo could together form a single building, whose rooms are not built in physical juxtaposition. En-suite rooms, so to speak, but then virtual ones. The spaces are then delaminated as Marcos once aptly put it. Trans-ports has yet to be realized in a physical form but I'm doing my best to change that both at TU Delft and in my own practice. Trans-ports will be the first truly e-motive building.

OK, let's play Trans-ports in Floriade mode.

The Trans-ports hyperbody can take on many guises. After all, the building body changes form and substance in real time. We can tune the hyperbody, we can design various modes. In the film we saw the Trans-ports installation for the 2000 Architecture Biennale in Venice in Floriade mode. Then we saw the self-explanatory Trans-ports mode, and Ilona has produced a Handdrawn space mode. Architecture changes in a matter of seconds into art simply by transporting it to another space. One of the most important issues concerning me at present is the exact nature of the relationship between form and content. When the spaces and our perception of those spaces are wholly delaminated, and when that perception is constructed there and then by informing the electronic inner skin, does the building body really need a form at all? Form allows function.

For this I should perhaps return to a statement I made ten years ago, in an article connected with an event I organized with Ilona in Museum De Zonnewof in Amersfoort entitled The Synthetic Dimension. On that occasion we asserted that it is not the function that determines a form, but that every form allows a variety of functions. In the end the function is much more a question of key management than of a concrete brief. This view is also applicable to Trans-ports: the building body allows itself to be
Kaas, could you give me a solid perspective on how this idea of a programmable building might evolve in the next, say, ten to twenty years?

I share the outlook of Ray Kurzweil, the software producer and visionary. In his book The Age Of Spiritual Machines he predicts that in about 2010 a personal computer will have the calculation power of a mouse’s brain, and in 2030 that of a human brain, measured in calculations per second. This is feasible enough, but then he extrapolates the development further: it means that in the year 2060 a single consumer PC will have the calculation power of the entire world population. And that’s news, for the PC will then have reached the hitherto unimaginable critical limit that will put evolution in a wholly new light. How are we going to work and play with these high-powered machines which, adopting many forms, will have penetrated deep into the pores of the products, buildings and built environments around us? How will we make contact, how will we communicate with that calculation power? What interfaces will we have to develop to get a true two-way communication going? We have to begin here and now by thinking about the communication between buildings and their users, we must find the tools to this end in architectural
Another thing, Kaas. we hear a lot about virtual reality these days, as if it’s something not so real, as if it’s a dream or a fantasy, but for some reason I have the feeling that you have a different view on this subject.

Kaas, please, don’t get involved in fields of knowledge where you are just another amateur, please bring us back to your architecture.

Virtual reality is more real than natural reality. I’ve always experienced virtual reality as something profoundly concrete. Virtual reality is more than anything else a kind of hyperreality. We should remember that the smallest building blocks of virtual reality are familiar to us. We know all the bits and bytes, and all the structures of both hardware and software needed to organize those bits and bytes. That’s something we can’t say about our day-to-day reality, as we don’t know exactly how this is built up. We accept it as it is, out of sheer necessity because our own bodies and brains come between us and that knowledge. You all know the book Powers Of Ten by Charles and Ray Eames. It describes the measurable area between $10^{-20}$ and $10^{20}$. But there is so much more, and there are bound to be an infinite number of warp holes in the universal space-time network that step outside the linear progress of such a scale. Of this we know nothing of even the smallest building block, and there are few who are able to say anything constructive on the subject. Even so, I myself would like to take this one gamble. Ten years ago I was invited by Joost Meuwissen to publish an article entitled Spacetimevolume in his magazine Wiederhall. I had included in it an illustration from my favourite magazine, Scientific American, that later proved to be of major influence on the preoccupation with blobs of, say, Greg Lynn, and served Rem Koolhaas as an inspiration for his TGB in Paris. It showed a cube-shaped chunk taken from the universe, so that this could be perceived with a newly constructed vision. Greg saw in it the visual power of the blob, which could be assembled from many slivers, or scans. Rem recognized the destructive power of vacuoles in the cube-shaped volume. But for me the issue was not that of incorporating the image literally in an architectural model, but that we see things as they are because we occupy an extremely local and temporal floating point in time and space. Were we to occupy another position we might, for example, be so constructed as to be able to move through walls and floors with the greatest of ease. And my gamble at that time was that every point on the space-time lemniscate is a potential shelter for a possible form of life. Our evolution then is just one of infinitely many possible evolutions taking place simultaneously, each with its own sense of time and its own scale. My concern was with the idea of parallel worlds. Speculating about it now, I am still intrigued by the idea.

In my view, natural reality and virtual reality belong to this notion of parallel worlds. They are both there at the same time. This is why I have been consistently looking since then for methods to link these two forms of reality together. That’s why I designed Sculpture City with Ilona and Menno Rubbens in 1994.
Don't look back, Kaas, that makes me feel sad, tell us instead about the practice and the research you are involved in these days, tell us more about e-motive architecture.

Kaas, all I need from you now is one example of e-motive architecture where it really benefits people, one example that makes me say: wow! this really makes sense, this works for me!

And that's why I wanted to build the Water Pavilion on Neeltje Jans as a virtual extension of the physical building body. That's why I specifically wanted a real time link between reality and virtual reality. The clients weren't quite ready for it, to say nothing - have you been there recently? - of the present management. These days the building is being systematically emasculated out of ignorance, evidently until all that remains is the physical reality those people understand. The Water Pavilion should be developed further out of my original fascination with the fusion of virtual reality and physical reality. I do hope the Netherlands Architecture Institute is prepared to intervene and give the building the renewed opportunity to evolve the way it was meant to evolve.

At present we are hard at work putting the finishing touches to a new multimedia pavilion, the so-called Web of North-Holland. You'll be hearing more about it soon. I hope to be able to interest the architecture faculty in taking this building over from the provincial government of Noord-Holland, once the Floriade event is over. We want to fit it out as a Protospace, an interactive space where students and researchers can walk through their parametric 3-D models, and where they can make changes in real time. This Protospace will act as a full-blown group design room.

Architecture needs e-motive styling. A few years back, we came to the conclusion that the momentum of the design process should not be stopped. It was becoming increasingly absurd to get the design process jumping, to galvanize it into action only to slam on the anchors, extinguishing the momentum. Armed with the slogan and now it has to be built, the designer is effectively cutting his own throat. Then it turns out that the whole project of animated architecture has only been a means of arriving at another form. And so this method will inevitably usher in a new formalism. Instead of freezing and consolidating, you yourself should be running the process. A mistake often made is that of elevating the diagram to form, when it must be patent clear that a diagram is a slice of time, and therefore says very little indeed about the process. It's a mistake similar to that of attempting to construct a space from a plan. It's just not possible to construct the original from a derivative. We must, therefore, craft the 3-D model in time. We must give shape to the process and develop a fitting e-motive styling for the new e-motive architecture.

Let me give you an example of the indispensible value of a programmable device. In countries where earthquakes are more violent than they are here, there are buildings that have programmable cylinders built into them to anticipate the approaching shock waves. These bring the building, as it were, into phase opposition so as to neutralize the approaching wave. It is recorded, a counterwave is constructed from the interpretation of the data and the cylinders are galvanized into action. The building acts here as an active information-processing machine in real time, but then only in the case of disasters. In the notion of e-motive architecture we use these real time techniques to activate the building and the perception of its space because this is what we want. E-motive buildings are in fact in a permanent state of crisis. How this crisis is dealt with is up to the programmer, the designer, the e-motive architect. I myself prefer to build environments and structures with a comfortable measure of unpredictability.
Kaas, I know time is running out, but can you give us a clue as to what the interaction between users and their environments might feel like?

How can you be so sure? And what exactly do you mean by programmable?

Is that good?

Will the building talk back to you?

A game? Is life a game?

But how can a building and a user play the same game, isn’t the building just the background where the game enfolds?

Will the buildings be obstinate like humans are?

When people communicate you never know exactly what to expect, would that be the same with programmable buildings?

Kas Oosterhuis

are as unpredictable as the weather. By rights they should succeed in infuriating you now and again because of the state they are in. We are most definitely not looking for an all-equalizing high level of comfort, in which users could be maneuvered into the role of passive consumers. I myself see e-motive environments as situations that stimulate us physically and mentally, environments that incite us in ever-changing degrees to active, communicative behaviour.

We can speak of interactivity between a user and his/her surroundings when that user is a transmitter/receiver, and the building components transmitters/receivers. Of course both parties have to speak the same language if they are to communicate. Communication builds up a dynamic database where the two parties put in and take out data in real time. Interaction involves at least two active parties. A whole range of possibilities are available to us to give shape to this communication. The data can be interpreted as desired. It is up to us designers to build a semantic structure for the move to the e-motive state, to program the interfaces and give them form. The architecture of today has to be programmable, and that architecture will be e-motive, architecture will be a multi-player game, architecture will go wild, I'm certain of that.

6-frequent icosahedron Web of North-Holland, Kas Oosterhuis 2001

You can change the parameters of the game the building is playing, you can communicate with the building in real time.

Communication is a positive thing, so why not communicate with your environment?

Yes, sure, it responds directly to what you do or say, it may respond in many ways: talking, moving, refreshing information content, playing music, it all depends on the game you’re playing.

It actually is, living in a building is a life performance, where both the building and the users are players in a game. And the good news is that we don’t know the rules.

Not necessarily, the building can become active, the building may act just as you as a person can act.

They'll have to be, otherwise the conversations between buildings and their users would be quite boring.

Yes, right, now we're talking – you know, buildings must become as unpredictable as the weather.
Buildings will be windy, rainy and sunny then?

Sounds fantastic.

Not all the time I hope.

Sounds just great.

Game Set and Match, Kaas, you win, thank you Kaas for being my virtual friend, goodbye for now, thank you E-lona, and thank you Saander, Chris, Michael, thank you all, and especially thank you professor Hans Bunderman, professor Mick Ayckhowt and professor Layn van Duyn who invited Kaas and myself to do research at the Technical University, and with whom it is a pleasure to work, I hope to see you all again at the Gamesetandmatch Conference at the Faculty of Architecture.

That too, but more likely they will move their floors and walls in unpredictable directions, and exhibit surprising capacities, they might even want to learn from you.

It is, architecture will become really wild.

Sure, the building might want to take a rest from time to time, the programmable building has many speeds, it can choose to be boringly slow like a traditional building or to be violently happy.

You play the game and set the parameters to match your desires.

Thank you for your attention.
A conversation with Marlon, Virtual Friend