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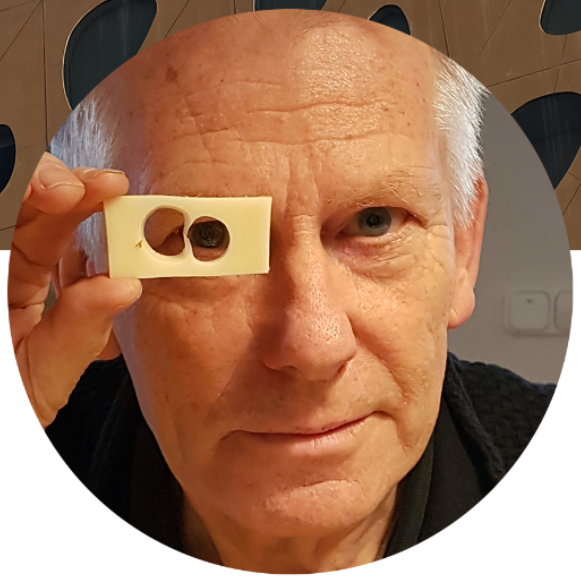

Lecture

The Component : 12 rules for another normal

25 October 2023

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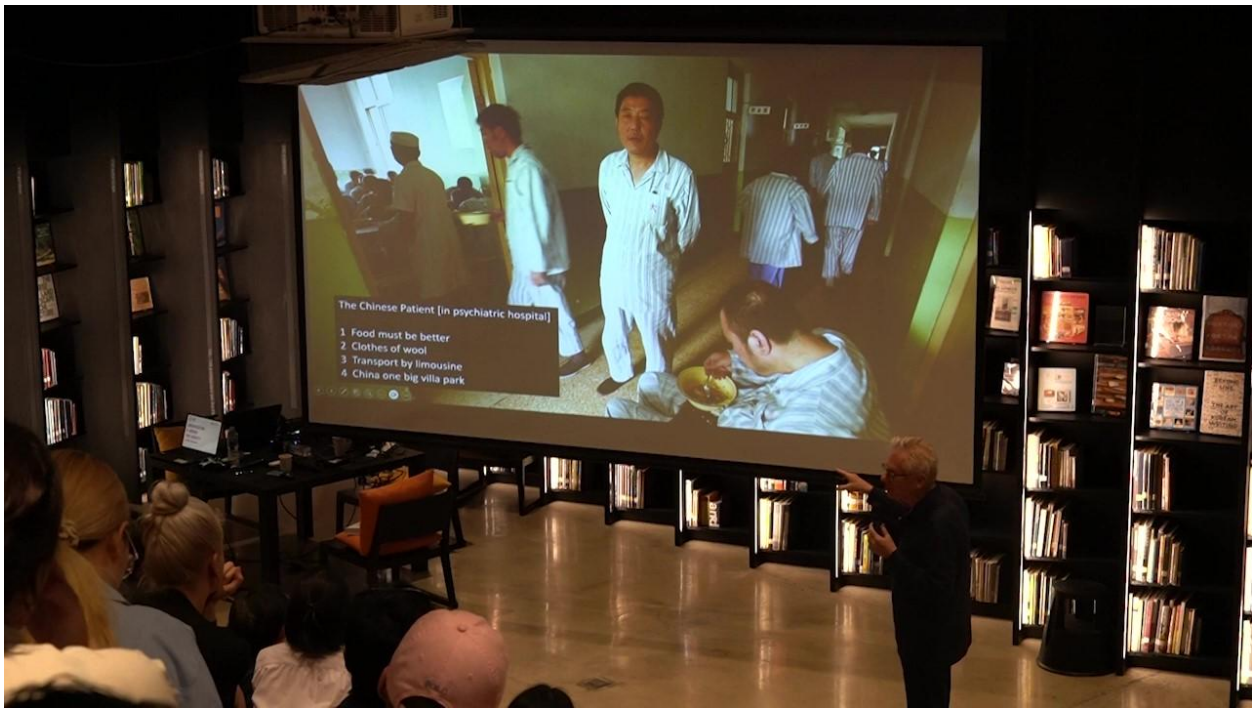
The Component : 12 rules for another normal

25 October 2023 at the Faculty of Architecture Chulalongkorn University

Participants: Professor Kas Oosterhius , Introduction By: Dr. Scott Drake



0h00m - 0h35m

The lecture delves into various facets of architecture, design philosophy, and societal considerations, offering insights into the speaker's journey from rule-based designs to more customized and diverse architectural approaches. The central theme revolves around the idea of creating diversity through simple rules and the application of these principles in various architectural projects.

Professor Kas begins by reflecting on the current architectural landscape and the transition from rule-based and interactive designs to more proactive components. The goal is to explore where architecture is headed, posing open-ended questions about the desired direction. Professor Kas introduces the concept of the Chinese patient, referring to the last chapter, which provides ideas based on the overarching theme that nearly everything they do is interconnected. The quest is to find a simple rule that can organically generate diversity and complexity without being diluted by exceptions.

A retrospective comparison between the speaker's first building in 1987 and one of the latest projects in Abu Dhabi illustrates the evolution of design philosophy. The emphasis is on adhering to a simple rule that fosters diversity while maintaining a sense of minimalism and

flexibility. Professor Kas draws inspiration from scientific principles, such as cellular automata, and explores how different rules can lead to either monotonous uniformity or intriguing complexity.

The discussion extends to swarm behavior, where Prof. Kas finds inspiration in the absence of a leader, observing how external factors dynamically influence the leadership within a swarm. This inspires the exploration of architectural responses in hyperbole, leading to research projects like the proto deck. This project, akin to a smart keyboard, integrates input from individuals working on the deck, creating a dynamic and responsive environment.

Professor Kas delves into the extensive research conducted in the field of hyperbody, spanning subjects like neural networks, immediate and interactive architecture, quantum architecture, and more. The emphasis is on dealing with unprecedented challenges, collaborating with various institutes and exploring cutting-edge technologies.

Transitioning to societal considerations, the lecture explores the concept of a fair and just world. Kas introduces the idea of applying visual rules to achieve fairness and justice, particularly through the lens of technology's role in architecture. A notable project highlighted is an acoustic barrier with a unique design, showcasing how a simple rule can lead to a diverse array of components.

The discussion then broadens to societal challenges, advocating for a fair adjustment using technology, in contrast to the dominance of big tech in techno-feudalism. Professor Kas introduces twelve rules, touching on controversial yet thought-provoking concepts such as ubiquitous basic income. Drawing inspiration from various thinkers, Kas emphasizes the need to act in the present rather than fixating on speculative futures.

Environmental considerations take center stage as the speaker proposes solutions to pressing issues, including reduced meat consumption and optimizing land usage for housing and agriculture. The lecture concludes by showcasing innovative projects that integrate sustainability and community engagement, advocating for a paradigm shift in traditional housing models towards more inclusive, environmentally conscious designs.

0h35m - 1h00m

The lecture continues with a project named "City Food" designed for 5000 inhabitants in the Netherlands, emphasizing its role in providing food for both local consumption and exchange with other cities. The concept revolves around creating a network rather than an isolated city, promoting diversity in food production.

The discussion delves into vertical farming and its potential to yield ten times more than traditional agriculture, highlighting its efficiency in terms of space utilization and resource consumption. The speaker advocates for combining vertical farming with energy and water

production to further enhance sustainability. The emphasis is on the abundance of space and the need for a shift in perspective regarding resource shortages.

Addressing energy consumption, the lecture proposes the idea that every individual, firm, or factory should be obligated to consume energy, promoting efficiency and sustainability. The speaker suggests implementing simple rules to create diversity and efficiency in energy consumption across various scales, from individual households to entire cities.

The conversation extends to the potential of self-driving cars and the Internet of Things, envisioning a connected world where everything and everyone is linked through IDs. The speaker raises questions about harnessing the benefits of connectivity and making it advantageous for society. Media bias is discussed, emphasizing the role of language and presentation in shaping public opinions and perceptions.

Robotic production becomes a focal point, relying on machine-to-machine communication for precision and efficiency. The speaker emphasizes the need for exactness in communication for decentralized, unique, and parametric designs. The lecture proposes a shift away from concrete in construction, citing its environmental impact, and explores alternative methods that eliminate the need for molds and scaffolding.

In this part, Professor Kas discusses 3D printing and its application in art and architecture. The Victory Boogie Woogie project by Ilona is highlighted, emphasizing the use of 3D printing to create intricate components with different depths. Kas describes the printing process, mentioning a zigzag path for the printer to naturally grow the components together into a cohesive part.

The concept of a hyperbody, referred to as a protocol cell, is introduced. The aim is to have a versatile component that serves multiple functions, including insulation, acting as a window, containing equipment, and providing wiring. He expresses a desire for a single, structurally and aesthetically integrated component that adds diversity to the design, drawing a parallel to the diversity found in nature through simple rules.

Several projects, including an exhibition project with light effects and projection of content, are mentioned to illustrate the application of parametric design and its use in creating diverse yet cohesive structures. Professor Kas discusses a laboratory project with web-based components and an arena with sensors and projection screens.

Professor Kas touches upon a tragedy involving a burned-down faculty building, leading to the repurposing and redesign of existing projects. Parametric details for retrofitting existing buildings are developed, and he emphasizes the power of parametric design in streamlining processes.

A proposal for a project in Qatar based on a constellation theme is introduced. The design involves a double hexadomal structure connected by bolts, showcasing the potential of robotic

production. He discusses the challenges associated with materials, reinforcements, and design connections in 3D printing for large-scale structures.

The presentation concludes with a discussion on home delivery systems, advocating for a responsible approach to waste management and proposing that manufacturers take responsibility for the waste generated by their products. He encourages a shift in thinking about waste and suggests that if a product produces waste, the manufacturer should take it back, placing the responsibility on them rather than the consumer.

1h00m - 1h26m

In this part of the lecture, Professor Kas discusses environmental responsibility, particularly in relation to plastic waste and the impact of individual actions. He criticizes the tendency of politics to hold individuals accountable for issues caused by companies, emphasizing the need for shared responsibility in waste management.

The importance of using technology in addressing environmental challenges is highlighted. He advocates for a technosocial approach, utilizing technology to improve production processes and reduce waste, rather than reverting to older, less efficient methods. The emphasis is on responsible use of technology to create sustainable solutions.

The discussion shifts to the fashion industry, with the Professor mentioning the efforts of Dutch designers who use recycled plastic in their designs. He acknowledges the PR aspect of such initiatives but underscores the trend of sustainable practices entering the fashion industry.

The proliferation of apps and the resulting increase in data generation is acknowledged, with a call to consider the energy consumption associated with these technological advancements. The responsibility for energy consumption is placed on the companies creating and maintaining these apps, rather than the end-users.

The concept of the sharing economy is introduced, suggesting that renting everything, from houses to cars, could become a form of shared ownership. The professor sees potential in creating a business model for real-time fashion streaming, emphasizing the benefits of such shared ownership and sustainable consumption.

Professor Kas introduces the concept of Multimodal Accommodations for the nomadic international citizen, emphasizing the adaptability of space for different purposes. This concept involves using technology to program and transform spaces to meet various needs, particularly in densely populated urban areas.

The presentation concludes with the professor discussing an idea called medic, involving real-time financial transactions and streaming income. The concept revolves around a continuous flow of money, allowing for real-time balance adjustments at an individual, company, or state level. He suggests that this approach could lead to a fair and just economic system, preventing financial crises through constant monitoring and adjustment.

It's important to note that the professor acknowledges a lack of expertise in this area and expresses a belief in the potential applications of real-time financial streaming across various fields of science and technology.

Professor Kas delves into interactive architectural elements, specifically discussing an interactive wall that responds to the movements of people. He envisions a future where various objects, such as chairs or building components, incorporate smart technology to respond to human movements or explicit commands.

The use of sensors, specifically festo technology, is mentioned. This technology involves making muscles using festo components, which can contract and change shape. He explores possible applications of this technology, mentioning projects like acoustic barriers that respond to noise. The idea is to have barriers that only exist when there's a need, such as when a train is making noise. The program is designed to communicate with components, making them act in response to the proximity of the train, creating a dynamic and responsive environment.

Professor Kas introduces another project called "The Million" in South Korea, which is an internal structure based on electronic pistons that can change their length, experiencing compression or tension. The movement within this space is designed to open up areas that would otherwise be enclosed, showcasing the potential for interactive and adaptable architectural design.

The concept of inclusiveness in architecture is discussed, emphasizing the term "non-silent architecture." The idea is that architecture should include all forms of traditional architecture rather than excluding complexity. He demonstrates this with an algorithm that, despite being the same, results in different forms based on the reference points.

The discussion concludes with a reflection on the open question of whether the envisioned goals are utopian or dystopian. Professor Kas emphasizes the need for specificity in reaching societal goals and acknowledges the complexity of designing for society. The role of generative ideas behind architecture in parallel with societal evolution is highlighted.

Lecture Transcription

Topic:The Component : 12 rules for another normal
Audio/Video Duration: 01:28:20
Date transcribed: 25 October 2023

Time	Speaker	Audio
00:03:54	Dr. Scott Drake	Hello and welcome everyone. Tonight is very special event part of the Lecture Series Architecture and Design for Society which will be hosted on behalf of faculty this year. As part of the 90th Anniversary Faculty Celebrations, I think we have a sponsor by Skulthai. Thank you for organizing this event. Alright, my name is Scott Drake. I'm The deputy Director at INDA. So, I see a lot of young school age guests in the audience. I'm hoping it's because you're interested in coming to study. So, if you would like to come study in the Thai Program. We have some certain people to talk to you. But if you would like to study at INDA. You can come to talk to me or we have some of our graduates here who are here with their boss which might be a good connection. But anyway we're very pleased this year to have invited Kas Oosterhius to INDA as visiting professor for the 2023-2024. I put out a call to various friends on Facebook around the world and said he'd like to come it but he's had many successful projects. So, we are very pleased to have Kas here. He's one of the pioneers of. I'm not sure how to say it but parametric architecture or organic architecture there's ten different ways of describing and none of them are accurate. So really one of the great pioneers of architecture in the 20th century. So, his lecture tonight as you can see is referring to his book which will be published about now. So keep in touch with what's happening. The lecture series is about design and architecture for society. So, contribution to society so Kas will talk about the various components of his book. Before we start, I'd like to ask the Dean Sarayut to come up and be a ministry photograph and gift.
00:05:04	Dean Sarayut Supsook	Welcome everyone to the faculty of the architecture. We also thank you Professor Kas to having us a lecture today. I think it’s very interesting and also experience working aspect and his teaching. Welcome Kas and Thank you very much for having us *They began taking a group photo and distributing giveaway gifts.*
00:08:45	Professor Kas Oosterhius	Okay, Thank you. To live up some expectations. My societal commitment is maybe I will try to build relations between some of those aims all of those goals society and try to build link to the work we have done. Some of the works it's obvious. Others it's less obvious but some tour the force to build that bridge. So, in another normal to cut a chore is just human.

		You may want to scan this image and you are directly connected to my website. (QR code has been included on the slide for individuals to scan and visit Kas' website) So let's see how it lands in the scientific world. We are often considered as architects that have this tendency to have a scientific approach to know things, not invade Gujarat assumptions of knowing things exactly. That's what we have tried to do in our architecture and that is what I tried. So, I want to let you know about the component deeply. So, this is one of the crucial chapters. Then, I go to the component itself. What is the situation now? And then I jump into proactive components, which relates very much to our activities at hypervarue Scopus. Referring to that we did complex architecture and we did interactive architecture. And from interactive, it's just one step to go at it. That's an open question. And I was referring to the Chinese patient, which is the last chapter. And he gave some ideas on the basis of almost everything we do is this. So, can we find a simple rule that creates diversity, that creates complexity simply by following the rule? And don't lose yourself into exceptions to the rule, then that rule should indeed be defined in such a way that it indeed creates diversity.
00:14:00	Professor Kas Oosterhius	(The image of Oosterhuis | BRN Catering, Rotterdam, 1987 | Liwa Tower, Abu Dhabi, 2014) What you see to the left is my first building, 1987. So it's quite a while ago that is actually also rule based in the age of prefabrication, standardization of as many elements. There I only use the word elements, as many elements as possible, so many of the same, to actually create a building, which is a very low budget building with the state of the art technology of that time. And then you see the other building, which is one of my latest, somewhere in Abu Dhabi, which is representing the idea of customization. So all of these components, when I use the word components, are all different, but they follow the same rule, follow the same simple rule that creates that diversity. And you see the difference in appearance, and you also see that I kept being faithful to a sort of minimalism, so it's a minimal flexibleism to create this diversity. You can see many other examples that create environmental diversity without being able to really control expo. I was always trying to be faithful to some rules that govern science, like, for example, cellular automata. Some rules in cellular automata creates boring sameness. So depending on the rules, one by one, law by law, and some edits just black or just white, others end up is creating reverse pattern. So, that has been inspiration in many ways for us also. This, when you bring it to life, when it comes to swarm, follow very simple rules, like keeping a certain distance, stabilizing the speed visually of its neighbors. Look at the direction. One of the main impressive things for science is that there's no leader, is that if there's an external factor that brings the score somehow return away, then

		suddenly another group is the leader. There is no leader, only very temporary and very local. For that condition. We found completely inspiring and tried to find an architecture that responds to that in hyperbole. We did many explorations, many research projects. One of these projects is this proto deck, where each component is rapidly designed. But more than that, it is accepting input from people working on that deck. It has pressure sensors, it communicates its nearest neighbors. So it's as if you were walking on a keyboard, basically, but then a smart keyboard, where the keys are connected to the enabling key. So it follows the principle of the squirrel. Also it follows the other principle of the squirrel, that they respond to external factors. They are not alone. It's not an autonomous system. Now. They are always swarming in an environment that has considerable impact in the way they behave. Some of the things we did in hyperbody, and this is slide from almost 30 years ago, I think 50 maybe. So we dived into many subjects that are still very actual today. Even neural networks were part of the research. There's immediate architecture, interactive, there's quantum architecture, whatever that may mean. But we have very smart guys looking into that. We have interactivation, Translab. We were connected to Marcus Nomad, etc. Robotics Institute. It was all there. And we had many projects like prototyping, making things work. It was today the thing that we said, you can do anything, but it has to work
00:17:09	Professor Kas Oosterhius	So I put in this slide. Now we are here, why don't we talk about creating a situation that can be considered a lab, that we're actually the smartest people work together, not only with people from the faculty, but also from innovation, etc. Okay, let's jump to some projects. First I show some project, and then I count them. That idea of the visual rules would be interesting for a more fair and just world. And technology and the application of technology in architecture is one of those rules. This is acoustic barrier with a cockpit inserted in it. You see very long stretch structure, 4.6 kilometer. And you see four lines here. And I talk about that later. (The image of ONL | A2 Cockpit in Acoustic Barrier | 2005) This is the structure as a worm. It's a simple 3D model, actually. It's flattened at the end, lifted up, almost floating, and then it's squeezed. It has two sides, two services squeezed along with a stretch. It's pumped up where there is the possibility to have a building inserted in acoustic barrier. This is how we designed it. So we modeled it. And then we went through this project. One hand sections, the other hand the experience, the 60 seconds of architecture. What happens is that the section is never the same. These sections actually are not sections as such, but are cuttings of a 3D model. But what is more important, how do you realize something like this, where everything is different all the time for a very low budget, minimal budget. We want to have it transparent, a bit less transparent where there is showroom for lush, but in the evening it lights up. We

		were told not to distract the public too much while driving a highway. So don't be too transparent. People in the other side were worried that it would reflect. But the actuality is that it reflects much less the sunlight than any other building. Because of the hesitation and the triangulation of the building, you only have reflection for very short period of time.
00:31:50	Professor Kas Oosterhius	Fault lines looking at cars is one of my main activities. When I am driving the road, I'm always looking at cars. Why are cars designed as they are? One of the thing is We share this acoustic barrier is we want it to reflect to the sky in the upper parts and reflect in the lower part, reflect the earth. So you have this division between the lighting up and darkening. And it makes it more slender, more slip, it makes it more acceptable as a barrier. And in Cardiff, it have many other functions, and actually acoustic area as well, because it stiffens the material. So you can use less material, thinner, thinner metal or thinner plastic. This is the interior. So very bright in the interior design, in such a way that the cars are actually lit by natural lights, and only for those darker periods and evenings. The lights in the upper line, see it interplaces up there, are helping and distributing some more lights. It feels if you were inside this building, actually, it feels like a terminal, 160 meters long, 30 meters wide, and it has an endless loop for the cars. Cars can go down there. The other side, they can go up here. So can you make a loop inside the hill? What I especially liked about the lighting effect, that it also projects the structure of the cars. It's not only the car, it's also the building, the car that absorbs the building. And these are my friends, Alton Sagio and Marco Snow. And I'm still hoping for that. Some of these guys maybe invited once because they're genius. Okay, building this is a simple procedure, a simple rule that creates this diversity of 40,000 different pieces of metal and 10,000 different pieces of glass. They're all different. So they have to produce according to procedure and algorithm process. We used scripting together, and we used the bio factory method to get the information from our machine to the machine, then they would produce all these components. I call them components, not elements. But each one is only fit in one particular place. And the archers, all they have to do is put them together in the right order. So they are not skilled workers. Not at all. The only thing they have to do is wait a number. And when they know they have a little piece of paper, this number, that number. Simple, really simple. And it turned out to be very cost effective. The scripting was done in such a way that we projected 10,000 lines horizontally into 3D model of acoustic burial. And then we wrote a script that asked each of those points, where are you in relation to your neighbor's neighbor? So here comes that swirling effect again, in managing the scripture, managing all the different components, and then asking to take one of those, put it down there, get the right measurements, right dimensions, and send these data to the factory, the glass factory. So, volunteering these rules, I call them rules could also be said to be laws or procedures or whatever. None of these is related to this robotic production. So I will feel more about that. I will also briefly go into the other things, and some of them are really social, but I try to discuss it in such a way that it's not just social, but technosocial. This in contrast with what is called techno feudalism, which is

		big tech actually dominating everything. This is using technology to build a fair adjustment. Let's see if it makes sense. If you can look at these twelve rules and then combine them and recombine them to create something that might be better. Some of it is controversial, I can tell you. Chinese station. He had four points for a better look. Very simple. This was a documentary in Dutch television. He said food must be better closer to home, transport by limited, and people with China to devalue. My question is, who doesn't want this? It's so obvious. But he was actually imprisoned because of this. So you can have opinions, but you just take care of the context in which you actually propagate those opinions. So he was ubiquitous. I use the U because it has to spread all over ubiquitous based income. I'm not an expert here, so I'm just a bit speculating, but you need stuff for that. You need to have a digital ID, you need to have a digital wallet, because I'm talking about digital money, paper money. And if there's a question, if there is money, I don't think that's a problem. So here comes my friend AI date. I asked how much money was printed in 2020 in the USA. And that's quite a bit, 30,000 per US citizen. That is basic income. That was in this context. I think building a fair and just society is also a justifiable context. And it has a history, it has a history of great thinkers and philosophers. And he said the same, you should not have to work for having a guaranteed quality of life. He also said, which I think that when education is finished, no one should be compelled to work, meaning also education should be free. (The image of Bertrand Russel and Martin Luther King Jr's quotes) So, this guy said the same, guaranteed income. Any problem with that? Yes, the US has a big problem with that, because they think this is socialism, communism. And I think this is one of the reasons this kind of shock. Maybe not only the racial question, but also I have taken some inspiration from youngest, from this book, maybe some of you have read it. He describes, in a science fiction manner, a science fiction novel, not a society, not a possible noun, where actually everything is sort of okay, where people participate in companies. He says, no shareholders that are not part of the company, only shareholders that actually play a part and active part in the company. So he has many criminal things. There's also a sort of time machine involved in this novel, quite intelligently broken together. And in the end, surprisingly, he says, maybe I prefer the messiness of today and think ahead from here. What can we do now and not dream away in a possible future, but actually look at here and now and act here and act now? Landgroit, I think, is another thing. It is typically considered as a communion thing. But is it? I don't think it is. Let's also have a debt idea that every citizen has birthright to the top of land, which is actually the case in the United networks and in Emirati they have birthright usually. Then they get married and then have a big loan to of the house. So it comes back anyway. But you need some measures to go there. And one of the things I think is an interesting idea, which is just an ID that is around for quite a long time. Eat less meat, reduce livestock. You can easily reduce it in half easily, because much of the land is actually used to grow forest food for livestock. So agriculture and livestock is made together in many ways. And it's imposed upon us basically to consume. We have consumed less easily. And then this is the land. If I would find on the Thailand wouldn't be much

		different, actually, maybe more densely populated. Although Thailand is one of the most populated countries in the world, this kind of land takes up more than half. We have a lot of space available for building a house. So here you see agriculture and livestock far stretches of land. So yes, it could easily be done by a simple rule, if the government also would just say, okay, we can do this. And they do things like this mostly in the reserve direction. So cows, they live in a density of three cows per hectare. When we build an environment for people, we built in a farm is 30 houses for hectare, is almost 100 people. So there's a factor 30 difference inequality, I would say how we treat cows, at least in relation to the point, was from my Caesar's project. Why don't we just switch? We do the cow part and then still they are quite good in that project. By the way, it's designer. We did two projects. (The image of ONL | Kattenbroek | social housing | 1991) One of our earliest projects, one here, it was built on the theme of north houses. So the north floor was quite expensive piece of North House. And we had this bar on top of bezel painting. We wanted to do away this traditional element of architecture. So we want to do something new, something that fuses art and architecture in some way. So this is simplest form you can do, but you can do it in social housing, no problem. It's not a matter of budget, it's a matter of where do you want to go. And if you ask how we want to live, it's more like this. You have a villa for it, you have houses, you have ample green space, you can do space for the walk, you can have it as a park, or you can grow food. This is Hungary. Many people do this. They grow their food, they exchange things with each other. This is community feeling in villages and in community cycles.
00:40:38	Professor Kas Oosterhius	(The image of Oosterhuis | XYZ Markerwaard | new polder | 1986) So this would be a solution for housing problem in Holland. This is one of my early projects, the creation of a new boulder where I said, okay, we have a lot of houses here, local blocks, a lot of blocks here. XY and a lot of high rise here. And it takes up the same space as agriculture. Not in the proportional land as we have now, but actually equal. And a lot of nature and a lot of world like wildlife. Basically certain areas for specific crops. Not crops, but specific nature zone, etc. And I learned from Bernard Chumi this idea of the grid. Imposed a grid on it to create unexpected events in that land, unexpected combinations. You could do the same for everything. This is change wise textiles, not exactly practical, I think. But it turns out that many designs, like this design of hell in Cyprus are doing it in a quite smart way. So you need big terraces, very big space. So don't come square meters. It needs to be a garden. And then you can section talking about green. What if we said, if he consumes something, like a fair deal, he must also produce something. Since March Madoon, we know that we are more and more becoming consumers. Not only consuming, also producing. So what if we apply that to food production? We could do farming at the household scale. And this actually happens. People who can afford it, I have to say, they buy this fruity

		vapor to grow vegetables, herbs. Well, this is very small scale. You can do it much larger scale in your household as well. (The image of Cepezed | Restaurant The Green House | Utrecht | 2018) Bigger scale is if you grow food for a restaurant. This is your Holland. Friends of ours, they can set. They built this design that is dry assembled, can be reconfigured. It's circular, as they say right now. And they grow the food that actually is served in the restaurant, no problem. You need some space. (The image of Bhalotra, Oosterhuis et al. | City Fruitful | 1991) But we have space design together with rotten in the urban designer from India, but working in the Netherlands, we call this project City Food. So 5000 inhabitants and it's providing for food not only for themselves, but also for exchange with other cities like this. So it's not an isolated city I'm talking about, it's a network. Not talking about autonomous producing just for yourself so you can grow things that elsewhere are not grown, exchange, preferably. (The image of Future Vertical Farming) We have this vertical farming. Everyone knows about vertical farming. It's important to know that the yield of vertical farming is at least ten times traditional agriculture. So if you combine this with the production of energy and the production of water that you need for growing vegetables, growing food, if you make the right combination, you need only 10%. So we have a lot of space. Don't think we have a shortage of. So energy production. Yes. Why should not everyone or every firm, every factory be obliged to consume energy? It can be done. It's not difficult. It only doesn't happen because there are other priorities that govern their business. But it could be a simple rule that could create this kind of diversity and this kind of efficiency. Passive, active network. All those skills must be active somehow. Mountain scale, community, neighborhood, city. And it guarantees who can be against any scale. So this is Cambodia. He needed the mobile territory, all the energy, no problem, he can do it. Any skill, (The image of Tesla | Solar Roof | 2016 onwards) Tesla can do it. And you pay quite a high price for that. But why not? We have all those groups, so why not? (The image of ONL | A20 Cockpit | 2018) This is one of my later projects and I hesitate to say this, this is a missed opportunity. Why wouldn't we have done this? It's perfect. So there are a lot of missed opportunities when it comes to building structure. Someone has to say, you just have to do it. And if everyone is doing it, no one will complain and it won't be a money problem. Ashok Madovska, the same designer, did it. He designed this neighborhood in Holland. So I have some local villages from

		Holland. I could have other examples of Norm, I think. But sometimes we are a bit more advanced with a lot of negative rumor about that. Europe is not competing with us and China at some aspects we are doing. (The image of Bhalotra et al. | City of the Sun | 1500 inhabitants | 2007) This is already 2007. So he built a neighborhood, 50,000 houses a day, fully equipped with solar panels, and it produces all the energy they need. So why not? It's that simple. The clients will say, okay, so you need the government to rule that you have that simple rule. (The image of Google data center | needed to generate its own electricity: > 20x roof surface + thermal storage) I'm talking a lot about it, technology, internet and robots. And it creates the need for a lot of data. So why don't you ask the data center to provide? Wouldn't they have the money, I think they would have anything. (The image of Californnia USA | solar farms | 2023) So step by step we're getting there. This is in California where you have a very large solar plan. And this model would be big enough to provide energy for a data center. So you have to realize that if you build a data center you need at least 20 clients service area.
00:48:54	Professor Kas Oosterhius	(The image of Corniche Tower | FEW production top-up | 2019) In Qatar we did a little study of the competition. We lost. I only saw this image. So what if you have an abandoned building and you want to have it producing its own energy? You would need some extensions, you would simply need that. Or you could plant the whole building in solar house, of course, but you would need that as a hole, that as an urban farming thing to feed the people that work there. And you need to harness water, which may be the most difficult part because if you do it in the analog natural way, you need quite a lot of space. But you can also do it in a technological way. But then you need sort power to generate. Is that a strange idea? I don't think so. If you are looking into the situation. (The image of Tokyo City) This is Tokyo, I think just look at the buildings. Only this is building depth is topping up the building. So there are a lot of things up there that could be used in a different way. It could be used for solar energy, food production from Thailand, from Bangkok. (The image of Plan B Tower) This plan B building, which is quite outspoken and I appreciate quite a lot the way they do their advertising by sort of fusing it with the architecture, with the size of the panels. Mostly it's just glued on top of the building. That's one thing that is good. The other thing is, okay, it's return investment by commercials, but you can have other forms of return investment as well. Water. It's more problematic, I must say, but it's the same story. Everything produce small scale in the desert for the next mutation. That's using some technology in the desert, solar powered and producing enough water for this alligator for desalination plants. On the larger scale, it comes down to. (The image of Sketch by Oosterhuis | Qatar University | M-NEX | HyperCube | 2019) This is a sketch I made for research project in Doha. It comes down to, you add

		another dimension to a building. We could call this first dimension because PsI isn't ideal dimensions, especially by the way, that's another story. Another dimension, which is the “FEW” energy, the nexus. Okay, let's look at the another component or society that is potentially beneficial. I'm talking about self driving cars, Internet of people and Things. Where everyone has an ID and everyone must have an ID. Otherwise you cannot get for a basic income. Everyone talks to everyone talks to everything talks everything. In other words, everything is connected. You are connected to somehow because the chair talks to you. So everything has some form of ID is labeled. And this is what the fantasy but taking place. But how do we take advantage? How do we make it that connectivity of everything and everyone? How do we make that beneficial? (The image of IoTaP | Autonomous transportation) This is how it may look like. This is the little thing. Chinese station. I already showed villas. This is the little thing. Fashion is another thing. If you think about closeness of move, we don't show it here. Although I have one image, it is fashionable and there is (The image of USA | 35.000 deathly car crashes per year). Okay, what is in the news, in the news. And that is media bias. This is always in the news. Autonomous car crashing. Making you feel bad about autonomous car. This is the reality, but not at the news. The reality is in the US, 2030, 5000 deathly car crashes per year. No one talks about acceptance. But if an autonomous car crashes, that is dangerous. This you can easily apply to politics. Just read newspapers today what is happening. It's very viral. Very much imposing opinion simply by using the wrong language and the bias language and showing one thing and not showing another. (The image of MUVMI | e-tuktuk) They love the E-Tuktuk,I think they are great. Really great. Sometimes I have to wait for long when it's Rush hour. But I heard they're going to expand it from 3 - 5 to thousand times. So let's hope it will work a bit. So I have to take the breath to get here next time. I hope it's the Tuktuk. And some of them are crazy guys. It was raining and then took us from somewhere near the river. Just radio, Internet, radio station. I have a Dutch. I would just Dutch. Loose, terrible music. Terrible. Not funny. And in a way, it shows the connectivity through it and technology. He connects. So he easily connects to us as Dutch people.
01:02:00	Professor Kas Oosterhius	Okay, now let's start robotic production. Let's close by tomorrow. It relies on machine to machine communication. Because everything else. If you use language, if you use communication only for these one people don't understand each other. Because we have different expectations. These different words for the same different language. But in machine to machine communication, they understand each other. They know exactly. This is package. Of course, you have to synchronize. That machine knows exactly. Not just greatly, but exactly.

		And this is the main thing. So it's this exactness that will allow for other forms of production. Decentralized, unique, parametric design, scripting. One of our things is to control this. That is the minimalist part of our job, actually. How we look at things. One building, one detail. If you can describe a whole building just by one component, that is paramedic. It has this huge variety of appearances and performances. It's very cost effective and it still creates that much desired reliability. The diversity we can call. We can call a trip factory manufacturing. It's always dry, so you can reuse it. Circular, maybe spiral. But we don't use concrete. So this is of course the main thing. What if we don't use concrete at all? If you look around Bangkok, 99% is concrete. So this is quite a shift in aperture. But you could do it because concrete, I'm saying no concrete though. This is the most polluting part of the building. By working like this, you don't need molds. So you build only once. Usually when using molds, you build twice. First you build a mold, asking not necessary. If you use way of working and we don't need scaffolding. I showed that in an example. You just put one component next to the other. To both it together in the building cell builds very efficient and very cost effective. It's hard to be totally radical for a building. (The image of Ilona Lenard | MyMondrian | robotic 3D printing | 2016) this is 3D printing. Now we are talking art. So not only talking architect fields of knowledge, we also talk art. This is project by Ilona. Here we have the victory boogie Ruby. It was unfinished, so that justifies to actually look into that. She was looking at the covers and each cover different depths. Then we 3D printed it in a way that every single part called component. We had this zigzag pass for the printer, so that it would naturally grow together, so it becomes one part, one that worked on the larger scale. (The image of Hyperbody TUD | ProtoCell | 2010) We did this hyperbody, we called it protocol cell. We wanted to have a component that has it all. That's the insulation. We think of insulation somehow everything is single glazing, no insulation. I don't understand why, but I can understand it from the history of building that I can. But not considering cooling and other speeds. We might have one component that does it all. It is a window, it may contain some equipment to control the pilots, it is wire it so you can run all the wires suppose that you require everything combined in one component, structurally, aesthetically, bold lines, aesthetically integrated into one component, one building, one deeper. And it's not boring. I mean, it is diverse. (The image of Hyperbody TUD | ProtoCell | GSM III International Conference | 2016 It somehow feeds the senses in the same way as nature does. I think nature also has simple rules. All the leaves of the tree seemingly the same, but they are different. It's a bit like that. Simple rules that create diversity. And here we used it for light effects and projection of content. Here and this part and you had an

		interactive part that some parts would actually come up if there was a speaker, and would function as same process for many of the buildings. (The image of ONL | iWEB | 2007 ONL | Web of North-Holland | 2002) We did after 2000, after the pavilion, where we actually learned how to do that. And we found this way of working like this exhibition project, looking from the inside to the outside. Having this escort bouquet might call this magnificent plane of light shadow. Really nice to be in there. So it's transparent. Somewhat later we redesigned it or repurposed it, reused it, took it apart, built it up again to function as our laboratory. Still the web consist web based. And it has this swirl like web components. 2007. Then there was a tragedy. I don't show you that faculty burned down completely. And also our map was no longer in use, because it was cut off from the infrastructure inside of. We have this space inside, which is a working space, and an arena inside that arena, sensors connected here, projection screens that could be inverted to work either at this part or in the middle part, when you have a group session in separate groups. So let's spent a goal working simultaneously come together in the arena, which is the same concept that we have for transports, installation at Vienna 2000, (The image of ONL | Bálna Budapest | 2012) Similar technology for larger buildings. This will be realized in Budapest Cultural Center. And the whole new structure is exactly obeying the same rules. As we get this cockpit, the client see the cockpit and wanted to have something like that. So that happens It's completely different. For the existing part, we also develop parametric details. Each brick is different, meaning that each window opening was different. So you have to parametrize it, streamline the process. So even retrofitting reengineer or retro reverse engineer the existing buildings is also very helpful. So parametric design is very powerful. Interior. We provide for some larger spaces for local musings that work very well. We've also used the building for the movie the last year again, probably, and then see that NASA headquarters will actually locate inside. (The image of ONL | LIWA Tower | Abu DHabi | 2014 This is projects in Abu Dhabi. Just to reveal the structure. Steel structure, all individually Jefferson components. They get actually X parts as one component and then collected two triangles. As long as we fused components of two triangles to fix the way we organized this process, because we were out there, we were working from the metals. We gave them a guidebook, procedural guidebook, what they have to do step by step, how all the components relate to each other parametrically. And one of the things that you should notice is that there's no corner. So the detail in the corner is the same as here, only different parameters, which is quite exceptional.

		The procedure, the rules are the same all over, and it's mapped on that three dimensional model, of course. So that's ruling as well. The curves are ruling, but not having a corner is absolutely efficient, because you don't need an extra detail. It's the same detail. So it is not us to say that is too much, too many details. Knowing me from the role, can you be more simple? Yes, this is more simple. (The image of ONL | The Seven Daughters | Doha 2019) Project we did for Qatar is a proposal, but still somehow in a slow process and consideration. Here you see it from in between two phosphor towers, how it would be positioned there on an artificial fear here in the underground entrance. And you would go from sphere to sphere. The design is based on a constellation, of Ursamayo. It's a star side. Some are bigger because they shine brighter. Some are farther down into the universe. And then they have different three dimensional position. And together they form this sign. And in Doha, there's a tale, a fairy tale, a historical one that's called the Seven Daughters, that relates to this sign, to this constellation. It's a double hexadomal structure. What you don't see here is that they are connected. But here you are inside the sphere and here you go using sort of bolts.
01:14:28	Professor Kas Oosterhius	(The video of robotic) Robotic production, ideally be it's local, so you don't use a robot. You would like to have a robot working for you pulled out of the container that becomes the workplace. You use components, you bring the components together and that's it. It looks almost like not believable. But we know from our practice that we can do this.There are some things you should know, of course, that the material is not exactly proper yet to do this, because you need reinforcements in the concrete fibers and you need to design the connections, which is the biggest challenge. You design the collections, not only the component itself, but how do you collect? We're talking about collectivity. How does the bird and score connect to the other birds? A radical version of that wall. In, well, detail is this proposal for the Dubai Expo 2020. (The video of ONL | Swarm of onsite production robots | 2017) We were almost there, but we just missed. We had three paths, interval water paths, a food path. And you could follow one path, but it could also step aside and then decide to follow another path. You see steps and you see slopes. He wants to have the slopes for small automated people that are not so good at walking. And we have the steps for most other people all over the whole project, one building, one detail, because every triangle you see is a component with a different performance in perforation, different performance of strengths, thickness of the steel, all the scalar data by a company in Holland called Central Industries Group, who are also responsible for advanced projects. For example, this company is very good company that produces components for the ship of this is the way to go. Forget

		all practice, go to manufacturers, even wood, steel, go directly to them and make sure that the project is predominantly their product. Then they will adopt the project. So we have a variety of ten different components. Then they will think, oh, I'm in development, but if they are the main one, they will act as the main professional. This I wanted to show, to illustrate that artists were actually looking into possible societies. Then robotization would take command months. (The image of Constant | New Babylon | 1958) Dutch artists who made a series of projects called New Babylon, he started in 58 and ten years in this project, my dear, production is overpriced. People are free. They can go wherever they. So they become new nomads, new international nomads. They don't compare to place, and the place will change all the time. As people are doing things, even if they are not working, they will do things. That's my belief also. If you are not earning your money by working for money. You will still do this, and probably even more so than working 8 hours a day for someone you are not really interested. Okay, Kostav believed this, Martin Luther King believed this, Russell believed this, many people believe it, but they always have this idea of, okay, but then we will have inflation, because people have money, so we will have inflation, people have more money, prices will rise, and then we will have the same situation again. Actually you have a lack of money, but many other people that say, no, this is not the case. Experiments, many experiments actually show that it's not the case. And people actually become more active. Home delivery is just something that I feel very comfortable, but it should be considered together with other things like produced locally on demand. You can minimize packaging because you don't need to track everything, because it's delivered in a much more organized way. You should avoid large scale storage facilities. It's combined with local production, it's automated, you have these traveling agent algorithms. And that leads to if you calculate, if you compare all the individual equipment of cars and people, public transport, anything to shopping centers and max, and to compare it with delivery, home delivery, much less thermometer, because it's much more efficient combining the delivery of people that are living up to park policies, more and more we will see this on the road. (The image of Meitau | Automated food delivery vehicle | 2021) This is in China, all our experiments, it works, but it raises a lot of questions. How do you pack your stuff? For example, is it still wrapped in plastic? Maybe we should rethink that is about waste. And I think that can be addressed by something like this. If you produce waste, you have responsibility. So if you have plastic, you don't have to take it back. Now it's a responsibility of the consumer, and we have that. If we buy something, we produce a lot of waste. Not because

		reproducing, because it's terrible to us market. Politics try to make people responsible for this, but they are not the companies of cell phone storages and low local production that is responsible for this. You can do different. (The image of Hua-Hin Beach) A few days ago we were in Hua-Hin and it was dirty and a lot of plastic on the beach. I think some of this is cleaned up. If you look into oceans, I mean, there's so much of this. (The Video of guys who wore all trash that he created during the whole month) And then guys like this make you feel almost personally irresponsible for this if you are not, because there's no one. If I buy some food or anything, because it has to live for quite a time by wrapping it and packaging, it can do that. If therefore local production and you have this shared responsibility for the water, production can be different. Step by step it can be different. And in my lead, it works only if you use technology for this, not if you go back to earlier days, how people would. If you use technology for the goods. I'm talking about the technosocial way of approaching this. Instead of a techno feudal way, which is dominant right now. Oh, here we have fashion. (The image of Melissa Sandals) So this is Melissa from this famous Dutch designers. They become famous design icons in Paris and they designed this recycling plastic. So, now you see it's coming to the data fashion industry. You all know that it's coming. They are proud of doing their thing, maybe not so proud of this, making Brazil. And they combine it with think that's something like vegan. So they combine it not eating meat, so they have all the good intentions. But of course it's PR, but it shows that it's coming. I'm not talking about anything that is here today. I'm talking about the year right now. These are some of the developments you see happening. Another thing you see happening, there's an app for everything. I think that's a good thing. It's so much more important in earlier days that you want to go to a travel agent or anything. Everything can be online, but it creates a lot of data. We don't forget to combine this. The need for producing energy when you use this. So it's not the responsibility of consular used by the big tech companies, but it's responsibility of those companies. You can rent everything. So maybe this is a good thing that renting everything, house, cars, whatever equipment, becomes a form of shared owner, as they say, sharing is having. And if you find a good business model for that, which is spending income streaming real time fashion, that could work. I think it could be very beneficial. .
01:25:25	Professor Kas Oosterhius	(The Video of ONL, QU | MANIC 24/7 | 2019) We developed an idea, we called “Manic.” Multimodal accommodations, for the nomadic International citizen in Qatar and I have earlier idea before, it's basically empty space, this deep floor

		and a deep wall, which can convert space into anything, into a bedroom, into a kitchen of 50 m². There are examples. I have seen some Chinese architect who's actually doing all of this in a bit more inhibited, restrictive fashion. The multimodality crystallizability of the space, I think has a big future, especially in dense metropolitan areas where you basically have 50 square meter apartment, but it has a single use type of petrol. This could be much more interesting as a space to live in. If we can p rogram it, if we can use technology, we use it as a social space. It's much larger dimensions. This is my last room. I have no knowledge about this at all. I don't really have some ideas. It's about real time. It's about connecting everyone to everyone and everything, etc. in real time. Meaning that everything is free. If I have income, this idea here, if I have income, it doesn't comes in regularly, minute by minute, second by second. So, I see some bar moving, money coming in. If I would spend money, that would be another one, money going out. So, if you would spend by cash in or whatever, the whole amount involved, gradually, everything would be streaming gradually, coming in gradually. So, it would be very easy to see a balance as an individual, see balance as a company, look at the balance as a state, and adjust in real time. Now we adjust every so and so many years. We have a new rule. If we have everything streaming, it's a different story. If you use it in the programming, I mean, not in the dominance way, but in the way of facilitating a fair and just world. That's maybe my lifey thing, but I sincerely believe in that. Then it would be much easier, and you would actually avoid getting broke. You would avoid spending too much, because that would be a warning sign, like we have in our programs. If we do scripting, we always have a warning sign. The dimension is too large, the angle is not good, which is one of the things you can build into scripting. So it's the same. It's the same about other things. So not my expertise. (The Video of ONL + Festo | Interactive Wall | 2009) So I totally agree here, but I think it will apply to many other fields of science and technology. Before this interactive wall, what it does, it responds to movements of people. So imagine a mall piece, any piece of any building, any chair, anything to be smart in somewhere to respond to your own movements, or maybe even explicit commands. But here we use sensors in the base that knows if there's someone there and then pre programmed. In that case, what it should do. We use festo technology, festival making muscles. So inside anterior and destruction, we have muscles that can contract with all these changes shape this moving rate of this,

		(The Video of ONL | Immediate Architecture | Dynamic Barrier | 2010) that make us think some possible applications. We have projects acoustic barriers. So why not have an acoustic barrier that is only there if you make noise? Why would you have a role if there's no train that makes noise? Doesn't make sense. The program is such a way that depending on the proximity of the train, it sends a signal communication to the components that one by one would act curled up before that acoustic barrier, and then relax again. The train has passed and maybe it would want to move by itself as an act of arrogance. Who knows? It could actually have will of its own at a certain moment. So this is a condition you are looking at for architecture. Architecture could become proactive, proposes situations where we would respond, which is one step below it's infrastructure, where you would actually do something first and then respond to your actions. They can act. (The Video of ONL | Digital Pavilion | 2009) Another example we did for South Korea called the Million. This is an internal structure that is based on electronic silence. Pistons that can change their length, so they take compression, else tension, which is different from the muscles of pesto, they only take tension. And the idea was that by moving in that space, you could open up a space that otherwise approach it then environment. (The Video of Christian Friedrich | Immediate Architecture | 2010) This is a movie that followed by its made on my request to show that this approach to architecture is inclusive. Many people talk about inclusiveness. What does it actually mean in terms of geometry? For me it means that non silent architecture, because that's the term used for it. No seller architecture includes all forms of traditional architecture. While at the other end, if you start from the polypole, start from cubes, it excludes all forms of complexity. So here you see exactly the same algorithm, but only points to certain positions that it is a cubicle thing, it's the same thing, it's the same algorithm. Only reference points are played differently. To me that's decent, that we can create a diversity that is inclusive and manageable and cost effective. So if we have all these rules, I was discussed here, and we make strange combinations, combinations that you have not seen before. We might get somewhere, we might get to a situation that is more preferable, more likable, better society. If you ask Chat GPT it says this, interestingly enough, it's very politically correct, but it's also very general. It doesn't say anything. Basically says be a good boy and then you'll get there. No, you have to be more specific. We have to really be specific in how we reach that goal and that goal. That's the open question. It's still open for me, like was open for body parties. Is that utopia or availability with dystopia?

		(The Video of raining in Bangkok) In other words, this is another now where we find ourselves in it's not to me, BTS, even if it rains. Thank you very much,
01:28:20	Dr. Scott Drake	Thank you Professor Kas. Obviously very difficult to think of society as something that you just apply design to. So really masterful server. There were both generative ideas behind the architecture and parallel society happens all sorts of. Thank you everyone for coming.