



DIPLOMARBEIT

FUTURE OPERATIC

**ausgeführt zum Zwecke der Erlangung des akademischen Grades
eines Diplom-Ingenieurs unter der Leitung**

William Alsop

E253

Institut für Architektur und Entwerfen

eingrichtet an der Technischen Universität Wien

Fakultät für Architektur und Raumplanung

von

Brian Hoy

1029527

Wien, am

eigenhändige Unterschrift

Die Zukunft Operatik: Eine digitale Veranstaltungsort für Musiktheater, eine Erforschung der digitalen Performance-Raum und die Raumkomposition von Sonic Narrative.

- Das Projekt hat drei Hauptziele:
- Der Entwurf eines bürgerlichen Anlage für das Musiktheater.
- Die Nutzung der digitalen Performance-Raum.

Die Komposition des digitalen Musiktheaterperformance.

Der Schwerpunkt des Projekts ist die architektonische Phänomen des Opernhauses.

Das Projekt dokumentiert die Prüfung und Entwicklung eines digitalen Theater Prototyps und eine damit verbundene Performance.

The Future Operatic: A digital venue for music theatre, an exploration of digital performance space and the spatial composition of sonic narrative.

The project has three principle aims:

- The design of a civic facility for music theatre.
- The utilisation of digital performance space.
- The composition of digital music theatre performace.

The project's primary focus is the architectural phenomenon of the opera house.

The project documents the testing and development of a digital theatre prototype and an associated performance.

THE FUTURE OPERATIC

BRIAN HOY

"If you don't cheat,
If you don't lie,
It is not only your glory, your achievement,
It is almost our only hope." ¹

James Baldwin

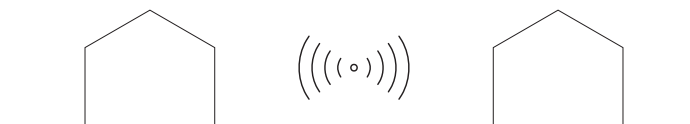
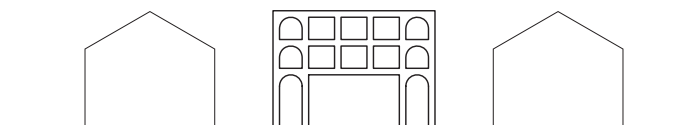
WHAT IS THE
AIM OF THIS
PROJECT?

OBJECTIVE

The project has three principle aims:

- The design of a civic facility for music theatre.
- The utilisation of digital performance space.
- The composition of digital music theatre performance.

The project's primary focus is the architectural phenomenon of the opera house.



PROJECT STRUCTURE

PART A: Observation

Placing the role of the opera house in the context of rapid urbanisation and digitalisation, to define a synergy between a performance space and the city in terms of scale and function.

PART B: Analysis

Investigating how the historic opera relates to the current state of affairs, identifying key characteristics that define opera, exploring the relationship of operatic tradition to contemporary music culture and looking at potential pathways for opera.

PART C: Development

Outlining a strategy for the implementation of digital performance technology as a civic music theatre facility to embody the ideas and concepts dealt with in Section B.

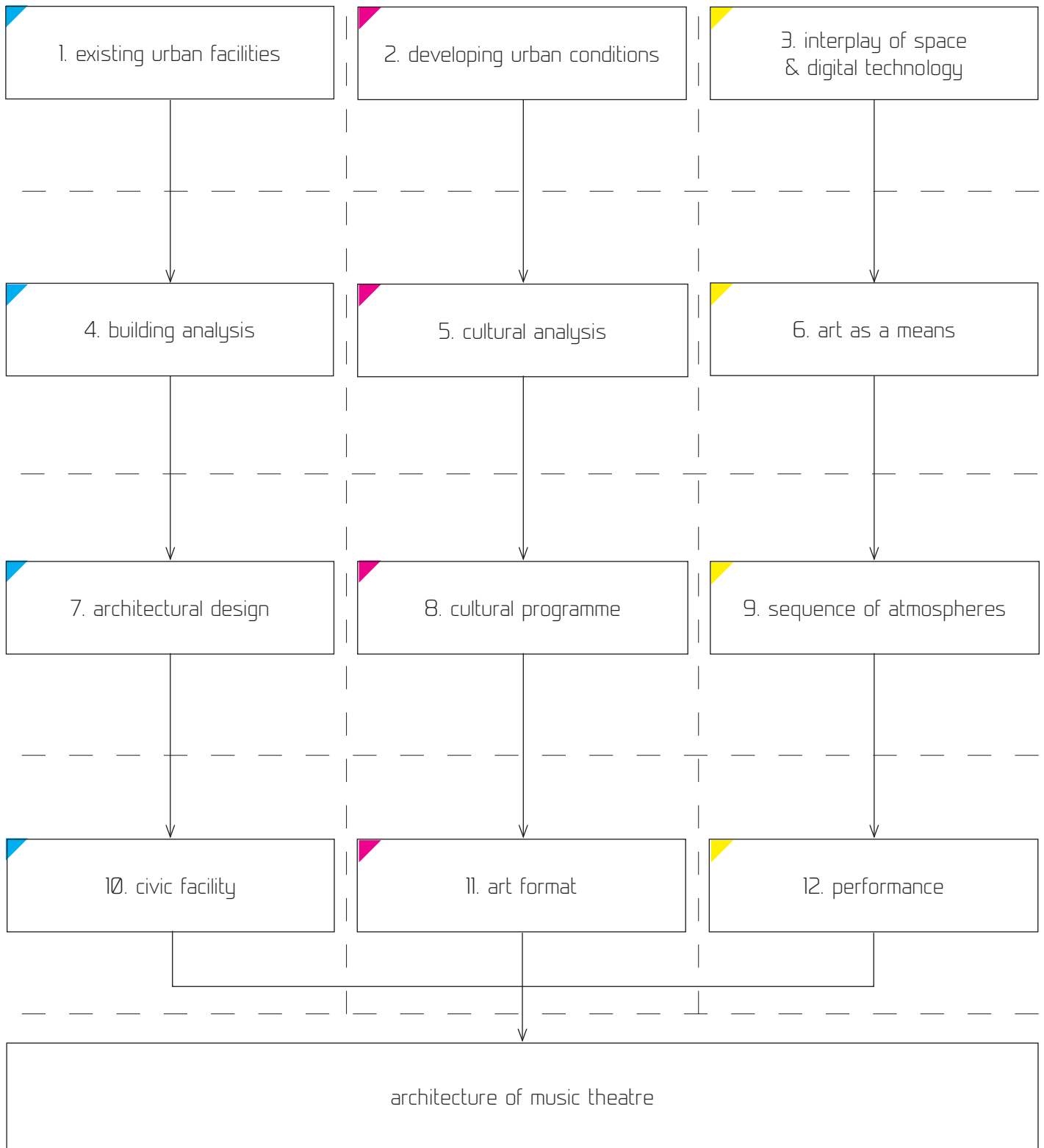
PART D: Implementation

Documenting the testing and development of the digital theatre prototype, the performance of a work composed for the facility and its reception in an urban scenario.

Building

Culture

Art



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1. HOW
APPROPRIATE
IS THE OPERA
HOUSE IN THE
CITY OF THE
FUTURE?

THE OPERA HOUSE IN CONTEXT

	City	Pop. (million)	Opera House	Seating Capacity	Standing Capacity	Year of Opening
	Beijing	20.7	NCPA	2,416	300	2007
	New York	19.8	Lincoln	3,800	175	1966
	Buenos Aires	12.8	Colon	2,487	1,000	1908
	Paris	12.2	Garnier	1,979	34	1875
	Paris	12.2	Versailles	712	0	1770
	Paris	12.2	Bastille	2,713	32	1989
	London	9.6	ROH	2,256	67	1858
	Milan	5.2	Scala	2,800	140	1778
	Dortmund	5.1	DOH	1,170	0	1966
	Sydney	4.6	SOH	1,507	22	1973
	Naples	3.7	San Carlo	1,500	0	1737
	Vienna	1.7	Staatsoper	2,276	567	1869
	Oslo	1.5	OOH	1,300	40	2007
	Venice	0.3	Fenice	990	86	1792
1737	Naples	0.23	San Carlo	1,379	1,621	1737
1637	Venice	0.14	San Cassiano	800	700	1637



Teatro di San Carlo, Naples ²

From looking at the relationship between the size of an opera house and the size of the city we can start to make loose assumptions about the supply and demand for opera in an urban context. We can see a synergy between the architecture, its socio-political context and this urban context.

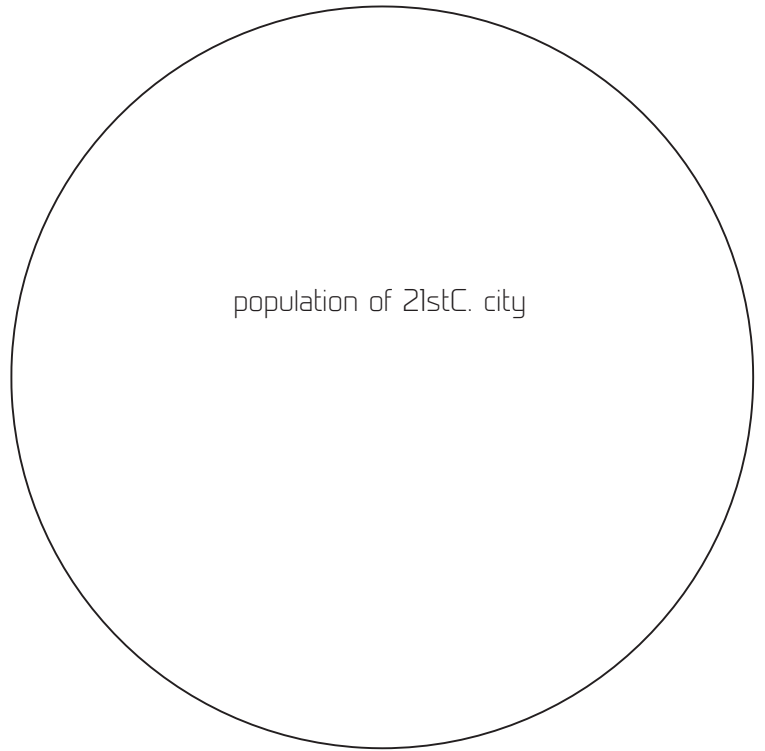
Technical aspects of the architecture such as the acoustic limitations of the auditorium effect the scale of the opera house, but it is the mode of consumption that I would like to trace - an attitude, a value and a place in both society and the city.

Source ¹

population of 17thC. city



population of 21stC. city

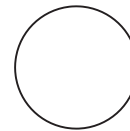


capacity of 17thC. stadium

NA



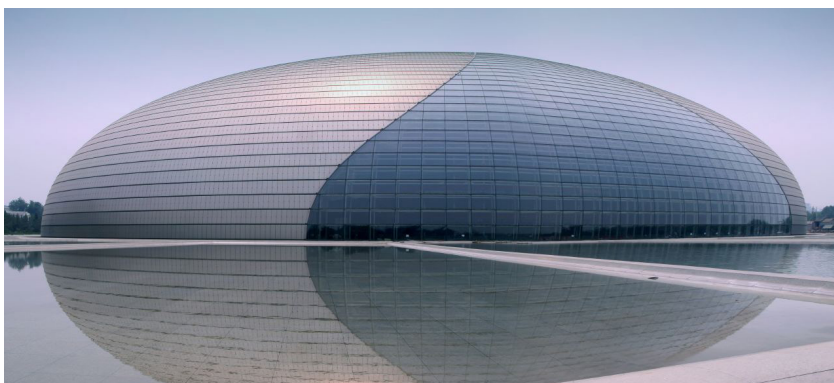
capacity of 21stC. stadium



capacity of 17thC. opera



capacity of 21stC. opera



National Centre for Performing Arts Beijing ³

The technical limitations on the size of the opera house have not been overcome in 300 years. Nor have we seen a multiplicity of opera houses proliferate through the urban environment.

While other types of architecture have grown with the city, the opera house can only grow by amalgamating itself with other larger concert venues, such as in the NCPA Beijing (left) whose 5473 capacity is in fact split over 3 separate halls.



2. HOW ARE URBAN PROFESSIONS ADAPTING TO THE DIGITAL?

DIGITALISATION AT STREET LEVEL

"Instead of being the replacement for the internet like we were before, we are an extension of the internet." - Mark de Jong

Bike messengers are amongst those hit hardest by changes in digital technology that have seriously compromised the need for their analog services. Since the 90s the internet has greatly reduced the necessity for messengers to deliver documents. The reason bike messengers have survived this change is their passion for riding, a passion that has helped them adapt to the digital age - in order to keep on riding. Will other professions have to follow their example?

I interviewed Mark de Jong, bike messenger and now the boss at messenger company Tour de Ville, Eindhoven (host of the 2008 European Cycle Messenger Championships) to hear his thoughts...

BH: Hi Mark, how are you?

MdJ: I'm fine, Thanks. This winter is great, or let's say warm, and there is a lot going on at the company.

BH: How is life in the control room now after being on the road so long?

MdJ: Being in the control room and sitting on the other side of the desk is a totally different world compared to being out there cycling. Operating with the big picture in mind, being responsible for all kinds of stuff and arranging work in this digital era isn't easy, but in the end it turned out to be a nice challenge to have to deal with these things. The work is totally different than expected but also great in a different way.

BH: When you bought the company in 2010, things such as FTP and digital signatures had already had a detrimental effect on the volume of traditional messenger work most messenger companies were doing, how did you anticipate that messenger work might change and how did you plan to adapt?

MdJ: I knew that without finding new kinds of work, the work that bike messengers were doing from the 90's

till around 2010 would become extinct. In the 90's bike messengers were the substitute for (fast) internet. We brought floppy discs, diskettes, cd's and towards the end dvd's from company to company. When I took over in 2010 I knew the type of business we were doing back then would decrease in volume. I didn't have a clear plan how to escape the downward spiral of declining work, but I saw some opportunities. The internet is wiping out our work slowly but it is also creating some. People are ordering more stuff on the internet so the package market is growing. Instead of transporting envelopes with digital information inside, our work is shifting to more physical stuff. To react to this change I bought some cargo bikes to transport things like print products, bread or lunches for companies and medicine for older people. We are trying to get a foothold in those markets now. Without having a clear plan I'm trying to see changes in the market and to look how we as messengers can react to these changes.

BH: Were there any unforeseen changes in the last few years as a result of digital technology and how did the company react?

MdJ: We lost our work much quicker than expected due to digitalisation. We not only lost our transport of digital carriers such as cd's or dvd's, but also the transport of demo prints from printing companies because computer screens got more colour accurate. So in the beginning we lost work faster than we could find new markets. I knew something had to happen fast to save the business. Our key attribute was speed and that was how we were selling ourselves. The work which demanded speed was disappearing due to digitalisation so I tried to market

our company as an environmentally friendly solution to all kinds of logistical problems. This worked very well. By showing customers that speed wasn't our only advantage they started using us for other things. That, together with the arrival of our cargo bikes, meant we got a lot of work which was done before by cars.

BH: You trained as an architect. Did your understanding of urban design influence your decision to buy the messenger company, for example did you take into account the economic and urban growth of Eindhoven and the small towns outside of the city like Best or Valkenswaard?

MdJ: My background as an architect didn't directly have anything to do with taking over the company. It was being outside, feeling the elements and feeling the street which lead me to the messenger business. When I took over I didn't use my architectural glasses in terms of urban growth or getting more global. But having said that, if



The custom designed, waterproof and lockable compartment of a Tour de Ville cargo bike, seen here on a bakery run. ¹

you have an understanding of how urban design works (urban designers being a community at the forefront of changing this world) you can observe these movements, how people react to changes in society and you can use these skills to develop all kinds of companies, including a messenger company.

BH: Architects are becoming increasingly more interested in what consequences digital technology will have on how people perceive space, non-architects probably less so. As someone with an architectural background running a small urban logistics company, what are your observations or concerns about how our work environment is changing?

MdJ: The internet gives us (as individuals and as a society) loads off positive opportunities, which at the same time scare me. The possibilities of the internet are endless. It changes people. Our urban social structure is changing with the digital era. The environment becomes more global oriented instead of local. At the same time



The Tour de Ville messengers in their work uniform which doubles as team kit on race days. ²

we don't have to leave our homes anymore if we don't want to. The internet delivers. Nowadays if people see or want something they expect instant satisfaction. This change in attitude and this type of satisfaction scares me, but at the same time it creates possibilities for the business because immediate gratification is where we come in. If people don't want to leave their house, we deliver to them. If people want stuff immediately, we can rush it to them. Instead of being the replacement for the internet like we were before, we are an extension of the internet.

BH: Tour de Ville has a lot of freelance designers and students on its rota. Does this have a positive effect on the business and how?

MdJ: We are really happy to have these inspiring people around. These people adapt early and are the innovators in society. You feel the fresh air they bring into the company with their open minded view of things. They see changes coming and they can anticipate. Of course I try to use their feelers to be a front runner in the business of messengering as well.

BH: Ever miss all that urban theory?

MdJ: Most days I forget I did those things in the past but other days I miss it a lot. Of course I also try to develop in business, to create new things and to experiment. Architecture does something similar on a different level. It is not the architectural philosophy I miss – I can do similar things in the job I'm doing right now – but I do miss the intensity of that urban theory that architects are occupied with. In the end though, I don't want to swap that for feeling the road and the elements every day.

BH: Cheers Mark, take it easy!

MdJ: My pleasure. If you are in Eindhoven you are always welcome to drop by, drink a coffee, discuss architectural stuff and go riding with the messengers.

26.02.2014

POLITICS OF A DIGITAL SOCIETY

"It is now possible to bypass traditional, often state-controlled, media to create an event and to publicise that event. The nature of activism has been transformed and now it's easier to take part in online political or social activities than ever before." - Mina Lazarević

As the communication infrastructure of our societies is being revolutionised by the internet and mobile technology, citizens and communities are potentially being empowered. This new set of conditions - a new social landscape as it were - offers new opportunities for those equipped to use them.

When it comes to the real life decision-making of influential persons within a community, who ensures that we are adhering to best practice in the context of the global community? Who ensures that in our methods do not become anachronistic?

I interviewed Mina Lazarevic, a sociologist working in a non-governmental organisation responsible for improving local and regional politics across the Western Balkans, specialising in gender equality, digital rights and censorship, in order to better understand how digitalisation is effecting the modus operandi of our socio-political machinery.

BH: Hello Mina, How are you?

ML: Hey Brian! I'm excited. Since I read some of your previous interviews, I'm hoping that this one will meet expectations. Researching the role of the opera today

sounds like a very political topic, and I would love to hear your opinion on that sometime.

BH: Could you tell me a bit about the projects you are currently working on and their social objectives?

ML: Ok, as you mentioned in the intro, I currently work in an NGO, on a gender program. This means that I work with women in Parliament. This is a very interesting initiative since female MPs in Serbia formed a group/caucus that meets regularly and tries to change or influence legislation in a positive way. Sometimes, my work can be frustrating since they can't always come up with a solution, but in other cases I have this feeling of fulfilment and working for a cause. What I love in this feminist community, is that we are all supportive of each other's work.

The other initiative on which I am working currently is with the Share Foundation. They are a young organisation composed of enthusiasts defending internet freedoms in Serbia. This topic is particularly important to me since recently we had some hard violations of Internet freedoms here - some self-censorship, removal of the content etc. The social objective is to defend the rights of journalists, bloggers and the broader Internet community to freely share their ideas and if necessary to defend them even in strategic litigations before the Court. The crew is made of artists, journalists, lawyers and tech experts, but we all share the principles of online ethics and culture. I was drawn to their work two years ago at a festival.

BH: What role does digital technology play at different scales of your operations? Are there some instances where it is invaluable and other instances where it is irrelevant?

ML: Hm, I was reading a lot about this during summer, and thinking how the internet shapes social movements and political actions. In my work I use the internet a lot – to invite people to meetings, to sign petitions (I am a big fan of that), I regularly tweet and post on Facebook the things that I am working on. This is some kind of transparency that developed naturally in the work of NGOs. For instance, I also get informed only from the social networks. In political terms, it is now possible to bypass traditional, often state-controlled, media to create an event and to publicise that event. The nature of activism has been transformed and now it's easier to take part in online political or social activities than ever before. On the other hand, I don't see that much of a change in terms of leadership, decision-making, responding to critiques, and organisational structures.

BH: Do you find that people need to be encouraged to utilise digital tools or are they already engaged?

ML: People here use Internet for medicine, dating, cooking, all aspects of life. People often use digital tools for social engagement, however we have seen some cyber attacks and unfortunately online journalists and bloggers were not prepared. That is why I think people should be more aware of possible violations of their human rights on the Internet and of possible cyber risks.

BH: Can you describe in general terms how digital technology has shaped the political landscape and the decision-making processes within it? What are the implications for citizens?

ML: Unfortunately Serbia did not have any of these new digital movements to significantly reshape its political landscape. In Bosnia, the Tuzla movement was really important in the sense that people felt empowered and became really critical towards their political representatives and the way democracy works. In Bulgaria, a similar uprising was held. In Serbia, during the floods in May I saw the internet community being shaken up and there was rage towards the political elite for hiding and removing important information from the internet regarding the flooded areas.

BH: Are there some cases where people's rights are threatened by digital technology rather than protected? What are the challenges that digitalisation presents?

ML: Every day we receive some new warning, the last one was a warning against Facebook Messenger. I believe that we should all be concerned about our privacy, and try to safeguard our personal information as good as we can. Possible challenges could be: the promotion of extreme rightist ideas, the rise of illegal activities, groups that promote dangerous behaviour (I recently heard a case about the right to be anorexic). There is no protection, some people will try to spread these ideas with or without the internet.

BH: If you could deliver a key message to people regarding the use of digital technology in a political context, what would it be?

ML: Indignez-vous!

31.08.2014

INSIDE THE OPERA INDUSTRY

"I think it's important and exciting to have contemporary artists and new technologies experimenting in the operatic form. Some contemporary classical music sounds as if it's exiting the field of music altogether, so I'm reluctant to hold opera to any kind of academic standard outside of it being a blend of music and voices in the service of drama." - Steven Whiting

The art of opera, historically enjoyed by an extremely diverse cross section of society, appeared to withdraw from popular culture during the last century, roosting high in the rafters of fine art, preserving its distinguished heritage and taking refuge from the manufactured mediocrity that flooded society. In recent years, the practice of digital and cross media arts has infiltrated both popular entertainment and fine art spheres alike, stimulating new concepts of performing and experiencing music theatre. As opera engages with a new set of circumstances, it has the potential to create a cascade of new art forms with their roots in music theatre, but it is also responsible for the conservation of three hundred years of tradition. So, what's the story?

I interviewed Steven Whiting, a freelance opera assistant/director, to hear his thoughts on the relevance of digital technology in the opera industry and how opera might react...

BH: Hello Steven, how are you?

SW: Great thanks.

BH: Could you tell us a bit about a project you are currently working on and where it stands in the evolution of opera?

SW: I'm working on David Alden's production of Billy Budd at the Deutsche Oper in Berlin. It's a great example of how the art form has evolved over four hundred years -a modern production of a relatively recently composed piece in a modernist building, in a city where opera and theatre are a thriving and vibrant part of society.

The story in particular goes against the operatic stereotype: set aboard a British navy ship in 1797, it deals with the individual within the system, innocence destroyed, and homosexuality repressed - themes which explored through chromatic music, through-composed to sustain the drama and tension, with text and language that is both rough and poetic. A far cry from the mythic

or high-class subjects of early opera, in works that were constructed from individual numbers often guided by conventions more than the needs of the drama.

BH: During your career, has digital technology ever endangered the opera or, conversely, has it given new life to the opera?

SW: Probably the most public benefit technology has brought to the art form is that many of the major opera houses now film productions and live-broadcast them to cinemas around the world. This has definitely increased the reach of opera, and although some people fear that this could pull people out of opera houses and into cinemas, I don't think the data backs that up. It'll never be able to replace the shared experience of sitting in a room with a live orchestra and the power of the human voice, but it can provide a real taster for it.

I think theatre and opera have been experimenting with audio-visual technology for decades now, but how best to harness it, and how audiences relate to filmed material (pre-shot or live, abstract or literal) is an ongoing and fascinating question. Not all of these experiments are successful, but it feels to me like the screen, the frame, the 2D moving image, are now a staple part of the visual conversation, contended with more often than not, and the aesthetic echoes of that influence are at work even where the actual technology is absent.

And of course digital technology affects all levels of production, as it does our daily lives. Directors harness it to make theatrical magic, designers use it to visualise and engineer (CAD programs, intelligent lighting, etc), stage managers use it to run shows, technicians use it to move set, acoustic engineers use it to improve acoustics, and opera companies are increasingly utilising modern programmes and processes to run their businesses.

In fact, the only downside I've experienced when it comes to digital technology is from the monitors we place around stages which singers use to watch the conductor. Analogue technologies communicated the musical rhythms in real time, apparently, whereas digital feeds from the camera facing the conductor always introduce a slight delay - meaning the conductors cue always puts the singer behind the orchestra.

It's unlikely to endanger the art form though.

BH: On an everyday level, how does digital technology affect your normal working day, either during preparations or during the performance itself - have there been any notable changes in the way you work or the way opera is experienced?

SW: I am waiting to meet the app designer who can work with me to create an app to replace my daily work of writing down the mechanics and motivations of the drama in heavy musical scores... it may be too niche a market though.

Where digital technology does help though is in the preparation phase: I've got access to thousands of different recordings online, I'm able to watch archive recordings of two recordings on my laptop, and I've uploaded them to dropbox so I can access them across devices and share them with collaborators. Email, messaging and skype are incredibly helpful for collaborating with colleagues and houses, which in opera generally takes place across two or three countries.

BH: The popularity of music videos and of online platforms where audio visual entertainment can be experienced is huge. As an opera director, what values, positive or negative, do you see in the way we consume media?

SW: This is a really interesting question. Alongside the tradition baggage opera carries (exclusive, expensive, dumb stories, fat ladies in helmets etc) I think a big thing holding people back from trying to experience it for themselves is the length of many operas. One thing I'm not sure anyone can really enjoy opera without, is an attention span, and I think that our attention spans are in general being eroded by the increasingly frantic tempo and aesthetic of our media landscape.

I'm not talking about twitter, or music videos, or half-hour TV shows, I'm talking about a general impulse to for all media (across mediums) to first and foremost snatch at your attention, often lieu of quality content. Bombastic 24 hour news channels that can never find time for a proper length interview on an important subject, newspapers that prioritise short human interest stories above their democratic responsibilities, a general impulse to ramp up the drama and conflict in any situation at the expense of the actual issues - I think this is the tempo to our media consumption, and it weakens our capacity for engaged, critical thought.

Of course, the variety and accessibility of devices to consume this stuff on does not help, and the constant yearning for a number in a red dot above your inbox or your facebook or your instagram is its own problem, but I wouldn't blame the tools: I can be streaming a TV show, checking my emails and playing a game on my phone all at the same time, but, the next minute I'm beginning a three-hour journey in a dark room, and I'm at peace. Because in the end, I think the extended engagement of live performance is a specific point of difference, a unique selling point, in a world of multi-device distractions. Unlike a book you can put down or a tvs how you can tweet through, opera and theatre are an oasis

for the mind and spirit - an experience that grasps your attention, holds it with magic and skill, and provides an oasis from the bleeps, bursts and red dots of the modern world.

BH: What do you make of the work of Michel van der Aa or the Invisible Cities Opera? Are they taking opera in a new direction or is this type of work exiting the field of opera altogether?

SW: I came SO close to seeing van der Aa's Sunken Garden in London, but I turned away from the ticket counter because it was just too expensive - even for a working person in the industry, let alone somebody who might otherwise take a risk on a new piece of work. I think it's important and exciting to have contemporary artists and new technologies experimenting in the operatic form. Some contemporary classical music sounds as if it's exiting the field of music altogether, so I'm reluctant to hold opera to any kind of academic standard outside of it being a blend of music and voices in the service of drama. Invisible Cities sounds like a phenomenal piece of work, and a clever approach to blending the visceral power of site-specific work with the audio needs of opera.

I have yet to see an opera that strikes me as exiting the field, but I very much look forward to it.

BH: What technological changes would you like to see in the opera?

SW: Oh, you know - light that turns corners or can be stopped in mid-air, affordable equipment that can improve the acoustics of any venue, 2-tonne scenery that can be moved completely silently, comms that work...

Fundamentally, creating and sharing opera is about problem-solving and people, and it's a process as old as humanity. Although it's always adapting to the possible, pushing it in fact, I can't think of too many technological developments (that aren't already happening) that would manifest a step change in the experience of sharing live music and performance with a bunch of other people. Maybe I just lack imagination?

BH: You were a student in Manchester. Do you think that post-industrial cities, where other forms of entertainment are already so prevalent, are capable of incubating new forms of music theatre? Could the voice of urbanisation ever be an operatic one?

SW: What a question! Absolutely, yes. Post-industrial cities have been the creative incubators of the last century - motown in Detroit, hip hop and disco in New York and Philly, the dance music scene in late '80s Manchester -

and these music and dance movements have an inherent theatricality - a story-telling component - either explicit in the work or the movement.

Perhaps the specific post-industrial conditions have moved into a self-cannibalising phase, co-opted, branded, gentrified, but the energies are being redirected to new urban concerns.

What shape will they take? We don't know yet, but although theatre and opera are not currently considered living civic languages for the masses, I think there's a very good chance they will be once again. An obvious reaction to our increasingly fragmented connectedness (everybody relating through multiple screens) is a more organic togetherness, and with young people in the west feeling increasingly voiceless within a democracy captive to capitalism, I wouldn't be surprised if eventually they try to share their stories in more immediate ways.

It's unlikely to take the role of a traditional through-composed marriage between a librettist and a composer conceived for classical instruments to be performed in a big posh building, but it's sure going to mix music and language, visuals and story-telling, and it's going to matter.

BH: Thanks for that valuable insight Steven, take it easy.

16.05.2014

THE JURISDICTION OF THE ARCHITECT

"In the environment that we have constructed, have we created a gap in our understanding of space?"

THE BOUNDARIES OF ARCHITECTURAL PRACTICE

The correct extents of architectural design have often been subject to discussion. Some schools of thought have preached a holistic approach where all things should be in total, designed unison.

"Nothing is legitimate that does not form an organism, or a link between the various organisms." ³ - Henry van der Velde, 1901

Subsequent permutations of architectural thinking often bring us to the opposite conclusion, that architects should exercise restraint - organising space, but leaving it free thereafter to be personalised and reinterpreted by the life of its inhabitants.

"Architecture is not life. Architecture is background. Everything else is not architecture." ⁴ - Hermann Czech, 1971

THE PROFESSIONAL SAFETY OF ARCHITECTS

The holistic approach poses difficulties in the professional market. The criteria on which work is judged become tenuous. The delegation involved decentralises decision-making, due to the distribution of skills and knowledge. Where there are no regulations there is a reduced level of accountability. Where there is no accountability there can be no indemnity insurance. That architecture should create a set of circumstances in which events might

happen, without seeking to intervene too much in the sensory experiences that will take place within them, appears therefore from a professional perspective to be a sound principle on which to operate.

OUTSIDE THE INSTITUTION

As our means of media consumption start to influence the way we experience space and as new technological associations begin to seep into our perceptions of what space is, we should question rigorously the value of operating within institutional parameters. The title 'Architect' itself has escaped the supervision of the institutions that, for reasons I will discuss, have protected it thus far and is now being reappropriated by those who are pioneering real changes in our environment. Considering the amount of time we spend navigating a digital environment beyond the physicality of the screen, it is not unfair that Information Architects have adopted the title 'Architect'. In 1995 0.4% (Source: International Data Corporation)⁵ of the world's population used the internet. In 2013 38.8% (Source: International Telecommunication Union)⁶, more than one third of the world's population was active in online space.

In 2013 a person fell from their apartment window because they were more engaged in the physically detached space accessed via their smartphone than with the conventional, walled and windowed space in which they was standing. The principal that 'architecture is a backdrop' generates a border outside of which the architect cannot operate. This border is a convention that governs architectural practice, but more powerful

than this border is another architectural tradition - the tradition of constant interrogation of the border. An attempt to explore the whole need not be an attempt to control it absolutely, but a need to understand spatial phenomenon that lie outside of our current jurisdiction is becoming apparent.

ARCHITECTS

Architects are people belonging to a group defined autonomously by its own governing body which responds to a certain commercial demand it perceives in society. The autonomously defined class of architects is exclusive rather than inclusive by nature, in order to control its market value and command fees, reduce negligence on its part and legally protect itself. As a result, it does not step outside of the commercial demand it perceives in society. It admits members based on skills deemed relevant to its autonomous definition.

ARCHITECTURAL SKILLS

This exclusive nature of the class of architects is consequently reflected in their skill-sets and the limited services that they can offer within the financial and legal protection of this exclusivity. The greater the technological diversity of the environment and the greater the number of skills there are to be mastered, the larger the skill deficit of architects and the larger the number of factors that are beyond the architect's skill.

THE BROADER FIELD OF DESIGN

Designers are a class of people who premeditate interventions, acting upon the environment in accordance with observations and anticipations. The class of designers does not obey the same parameters of exclusivity that the class of architects do. Designers are an inclusive group, the opposite of architects (All architects are designers. Not all designers are architects). They are not so stringently licensed and their signature does not carry the same level of accountability. Design in this

broad sense, however, is free to cover the manipulation of all aspects of the environment, not just those prescribed by the sub-class 'architects'. There is no restrictive border convention.

ARCHITECTURE OF INTERFACES

An understanding of the interface through which we engage with prosthetic digital space appears to sit outside the boundary of what is expected from an architect. We have the technological capabilities to synthesise many aspects of this space, be it visual, aural or tactile, but the level of architectural involvement along this digital/physical threshold is minimal. The treatment of this threshold has not been claimed by the practice of architecture, due to the secure institutional definition of architectural skills.

More complex social, phenomenological or neurological mechanisms of space such as intelligibility, symbolism or ethical and political subtexts are not alien concepts in schools of architecture and can be highly valued nuances to be explored in the pursuit of architectural mastery. To address the senses directly however, the way a headphone designer or a spectacle designer might address them, is considered to be a narrowing of the possibilities of a space rather than something that could multiply them. In this way, architectural culture places the understanding of new types of space outside the jurisdiction of the architect.

At the same time, if architects perceived a commercial demand for the spatial design of digital interfaces by architects in society, they would evolve their skill set. Therefore, it is not the desire of architects to restrict their practice to its current definition, but rather the absence of perceived commercial demand for other skills which prevents them from engaging in the spatial design of digital interfaces. The result of this feedback loop is that a professional body, with very good reason, does not award the title 'architect' to people who are working with new types of prosthetic digital space and their associated interfaces.

IMPLICATIONS

So what are the implications for architectural designers who want to operate on the threshold between the new type(s) of prosthetic space and the physical?

There are people who design the architecture of new types of space.
(evident in the work of Apple, Samsung, Google, Microsoft etc.)

Architects do not design the architecture of new types of space.
(evident in the careful balance of risk in a standard agreement, the conditions of appointment for an architect etc.)

p	q	$p \wedge \neg q$
T	T	F
T	F	T
F	T	F
F	F	F

Therefore, only a person who is not an architect can design the architecture of new types of space.
(those who operate under the title Architect are professionally restricted to their institutionally recognised services)

CONCLUSION

We may think that to include the design of digital/physical space interfaces in the jurisdiction of architecture would be totalitarian, but in the environment that we have constructed for ourselves where we spend so much time operating through digital interfaces and using wearable communication technologies, are we creating a gap in our understanding of space? Our spatial experiences will be designed. The question is: by whom will they be designed and with what kind of critical rigour?

Perpetuating the exclusivity of the title 'architect' may help architecture as we know it to survive professionally, but it will not help the next generation of urban designers transfer centuries of knowledge and understanding to our future environment. Instead of investing energy in pushing the boundaries of architectural convention, maybe we should be exporting architectural designers towards new fields of expertise where our environment is really being created, leaving the title 'architect' behind.



3. WHAT ARE
THE EFFECTS
OF DIGITAL
TECHNOLOGY IN
THE OPERA?

SUNKEN GARDEN ENGLISH NATIONAL OPERA

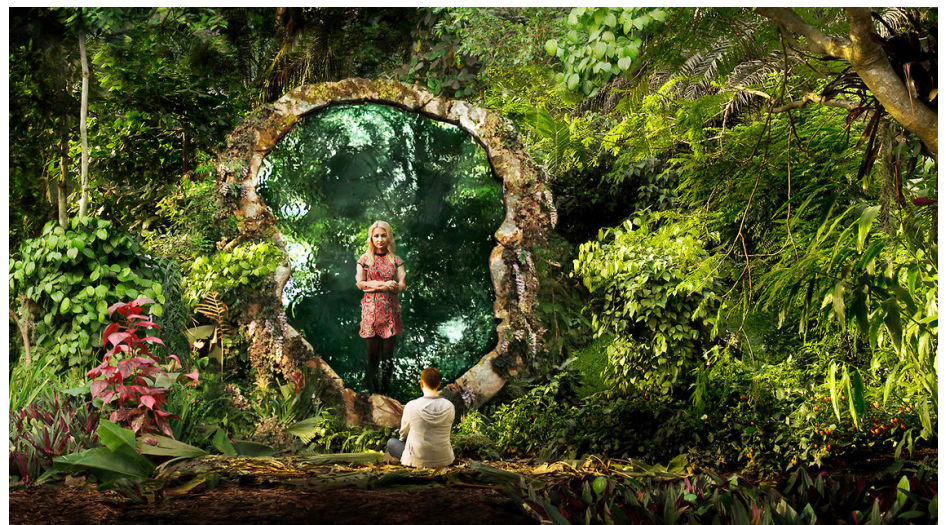


Van der Aa's *Sunken Garden* combines film, contemporary music and computer visualisations composed around a libretto and performed in an opera house. Although it was billed as an opera, in many ways it pushes the conventional disciplinary envelopes. It made use of 3D cinema technologies, which took the user experience to a space beyond that of the immediate physical architecture and the transcendental space of the music, essentially utilising an abstract dimension that exists only in our perception, that can be triggered by technology. It is the use of technology to access extra dimensions of our perception that is particularly relevant to the *Future Operatic*.

"I think I am more positive about the future of opera than many of my composing colleagues, because I like the way it fuses different artforms. It matches my way of working - thinking of text, music, video and stage direction at the same time.

I like opera that can draw you in close, which has an intimacy, far removed from traditional grand opera. The drama can be just as powerful, even when it deals with ordinary people: This is the operatic area I want to explore, finding new angles and stretching the vocabulary."¹

Michel van der Aa



upper left ², lower right ³

INVISIBLE CITIES OPERA



The Invisible Cities opera is an experimental piece of music theatre, full of contradictions and lessons. It merges opera with public performance art, yet divides the audience from the public. It reconnects opera with the everyday life of a city, but does so through an incredibly complex sonic infrastructure. It offers the audience a wireless experience, yet uses an unbelievable amount of in-situ cables and hardware to provide this. The project is carefully sound engineered and uses special effects to create the desired acoustic spatiality, with the emphasis on the panning, reverb and overall sound quality. This raises the question of how exactly the different attributes of a performance are prioritised.


"The piece, which is so intimate and so warm and so fragile, would best be suited being heard as if it's being whispered in your ear. It's a story that's really meant to take you to a very internal place. It's not about a traditional narrative and more about experience as narrative.

I've often thought that one of the joys of opera is that your ears get to watch and your eyes get to listen. The more you can create scenarios in which that confusion of the senses, that cognitive dissonance, becomes a part of your experience, that's a way which we can expand all of our senses." ⁴

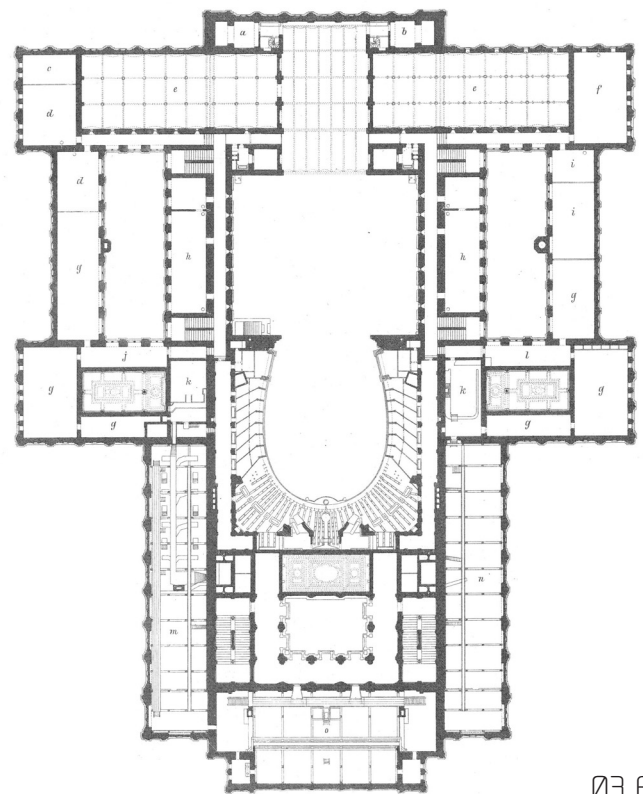
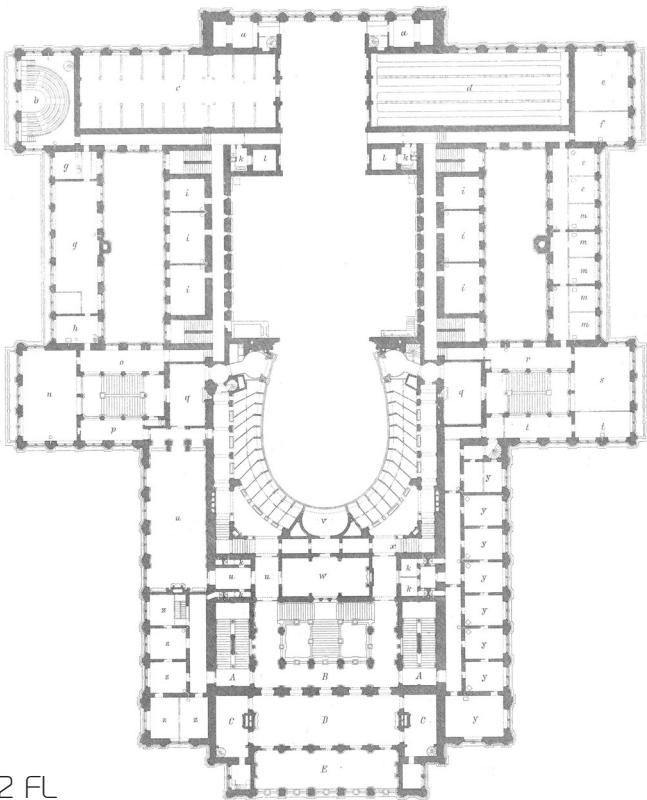
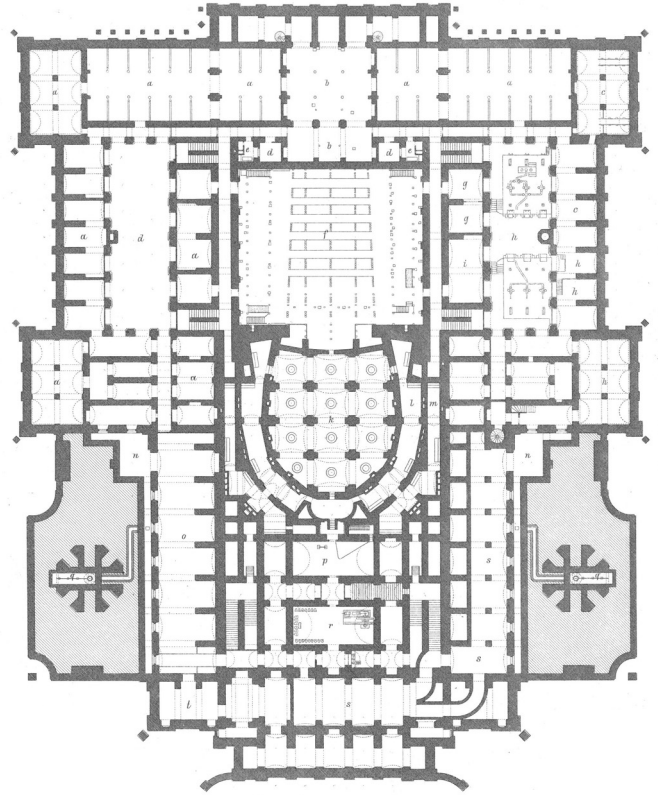
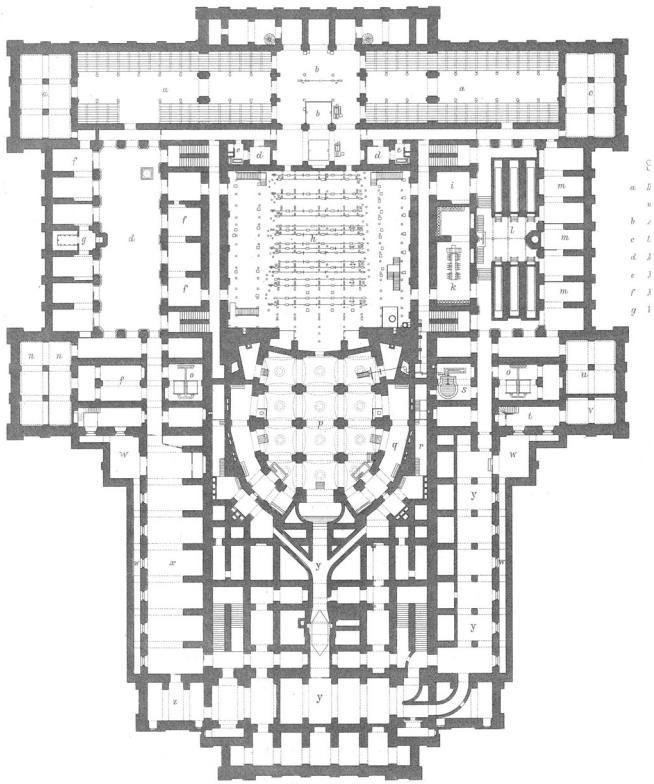
Yuval Sharon



upper left ⁵, lower right ⁶

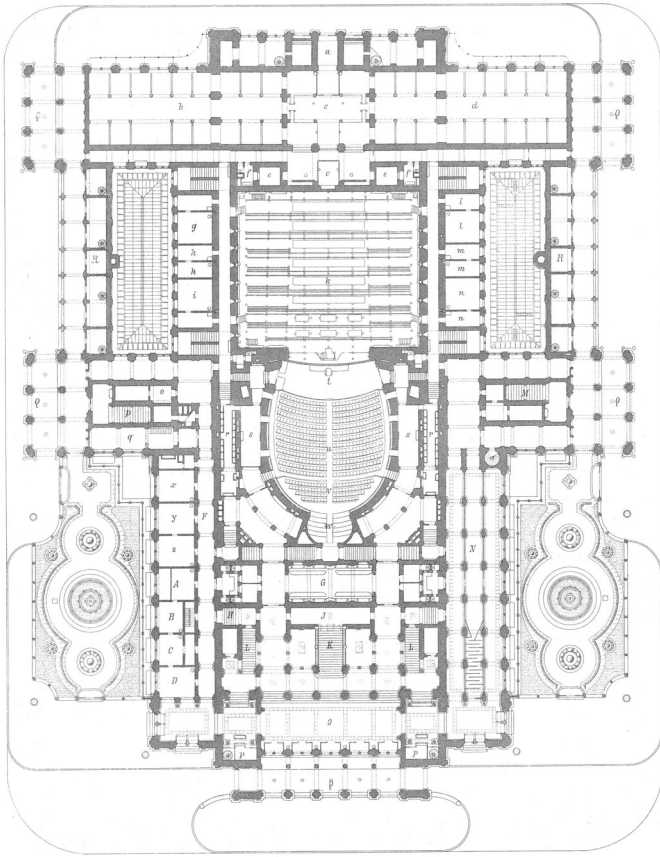


4. IS THERE A
TREND IN THE
THEATRE AS A
BUILDING?

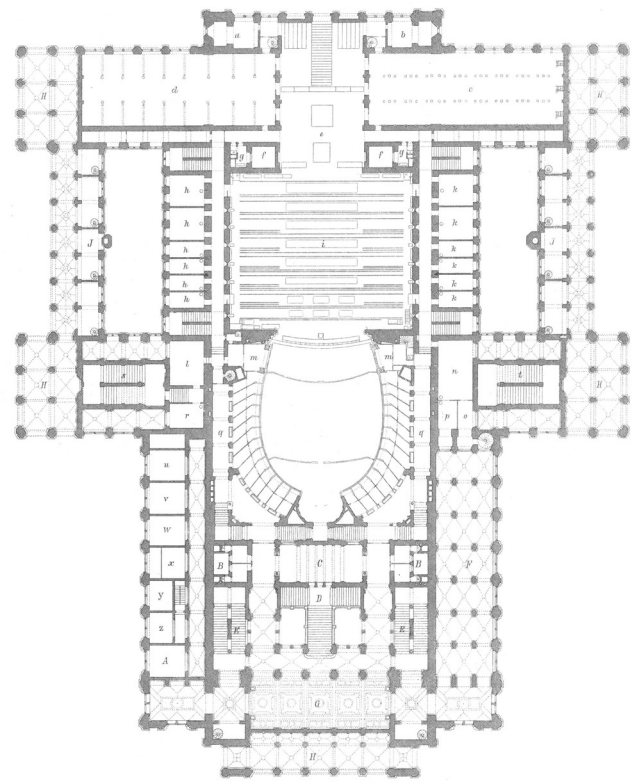


BUILDING ANALYSIS: VIENNA STATE OPERA

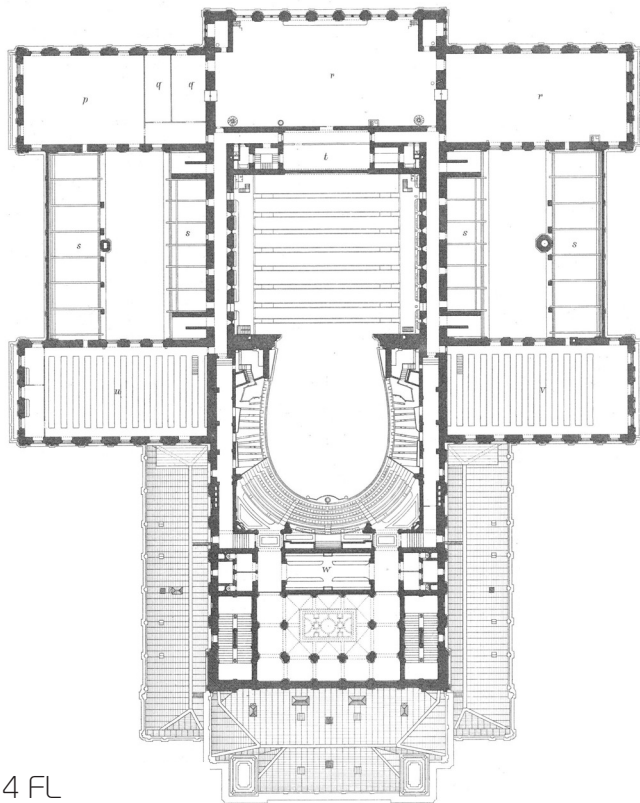
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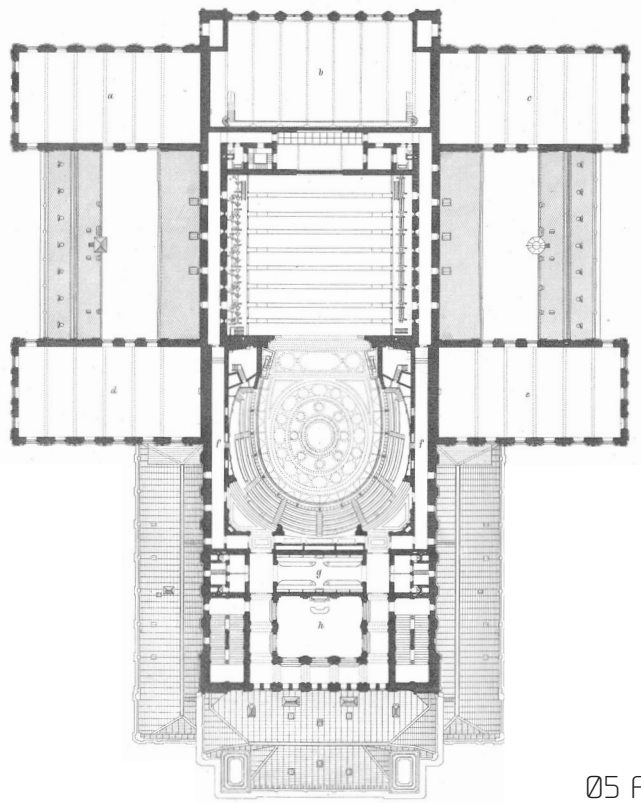
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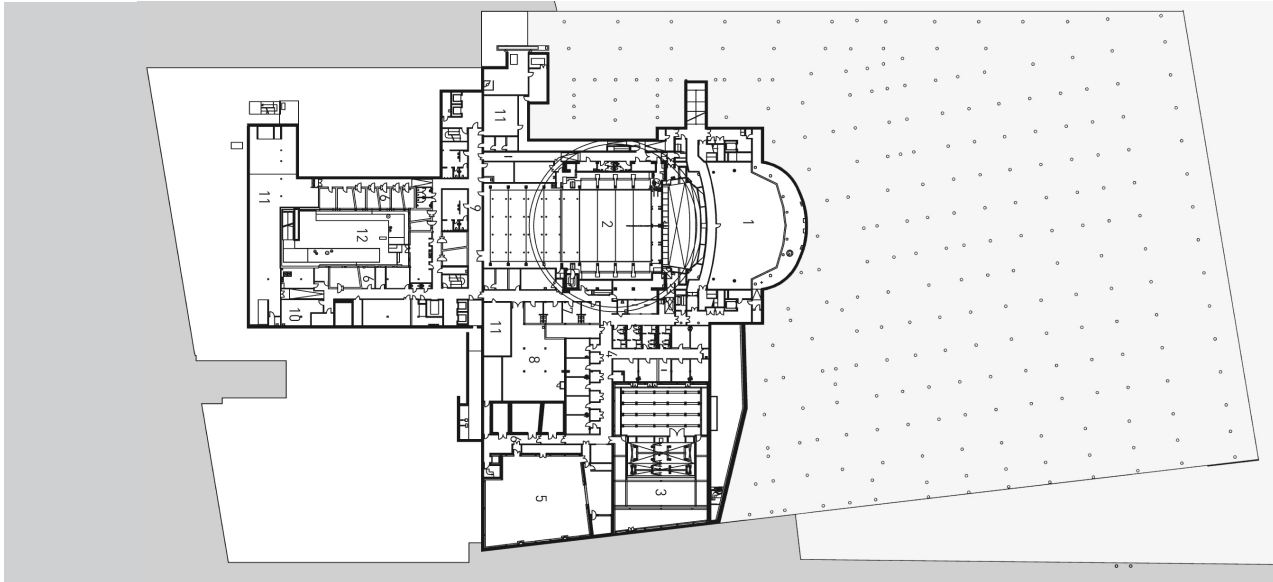


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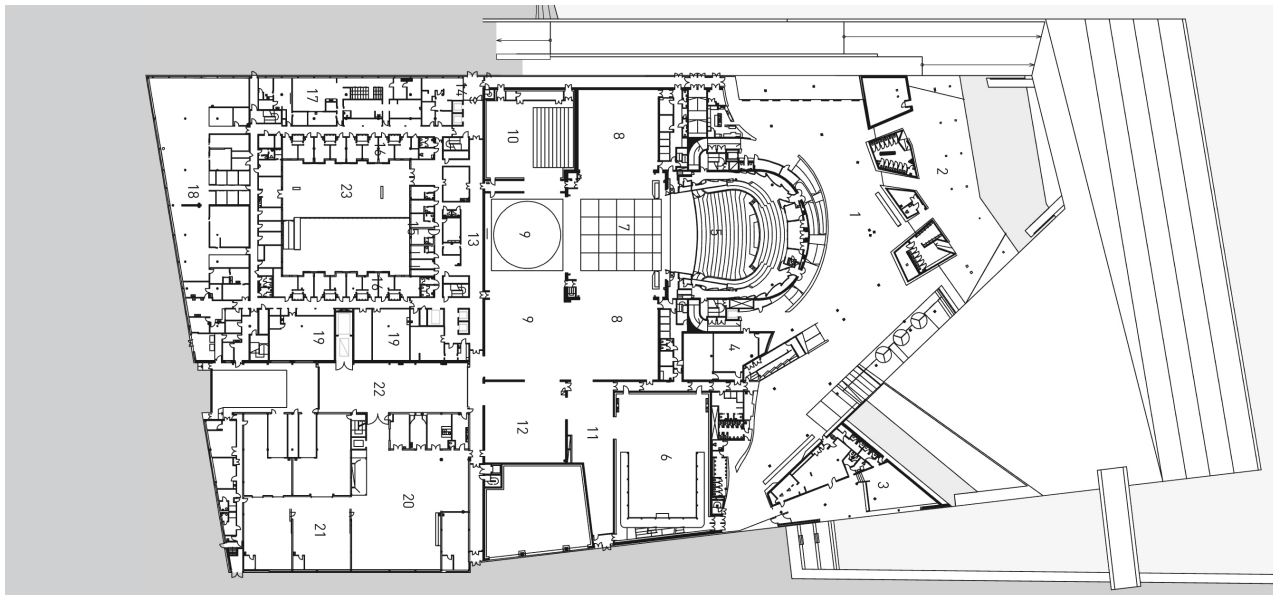


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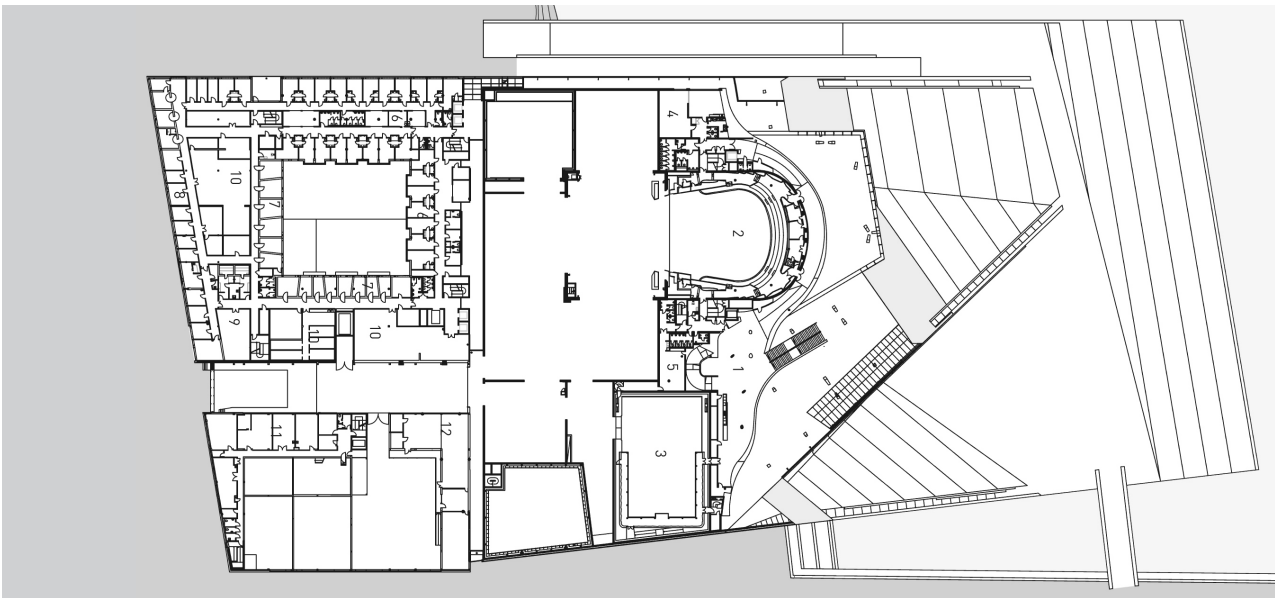
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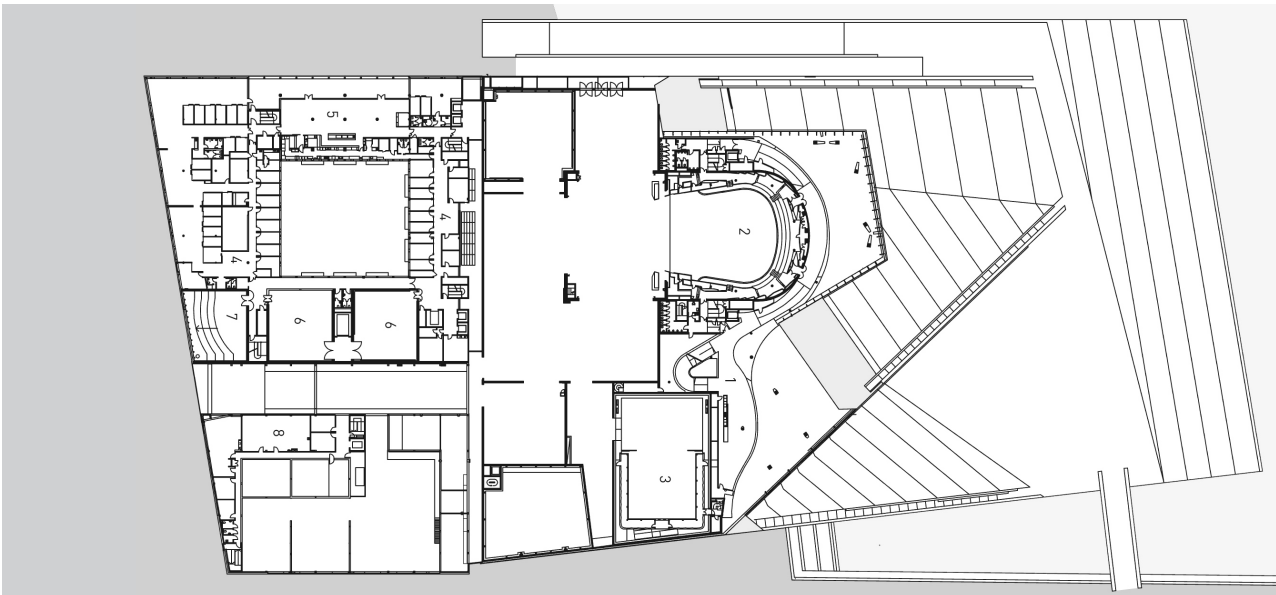
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BUILDING ANALYSIS: OSLO OPERA

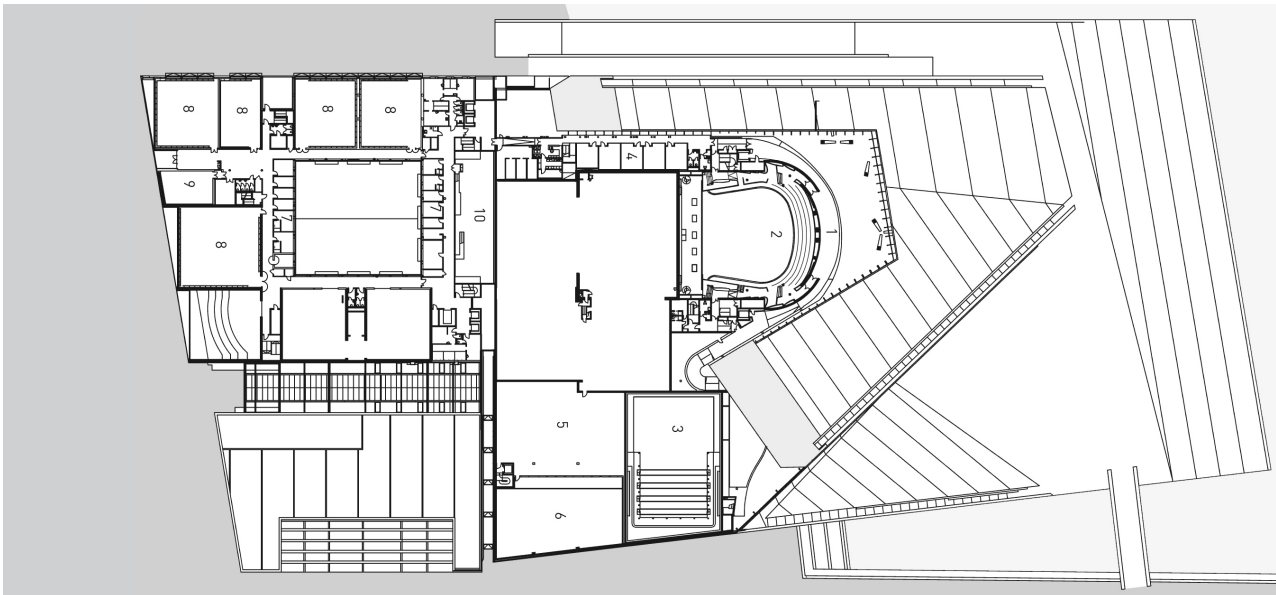
Source ²



Ø1 FL



Ø2 FL



Ø3 FL

CIRCULATION/ BREAKOUT	TICKETS/ REFRESHMENTS	SPECTATING	BUILDING STAFF	BUILDING SERVICES	PERFORMATIVE	DESIGN
Foyer	Shop	Floor Seats	Firecrew	Machine Store	Stage	Scenery Workshop
Cloakroom	Buffet	Standing Room	Caretaker	Coal Store	Orchestra Pit	Painting Hall
Vestibule	Celebration Room	Boxes	Mechanic	Wood Store	Substage	Props
Waiting Hall	Ballroom	Gallery	Porter	Wood Store for Carpenter	Theatre Master	Costume Workshop
Conversation Room	Ticket Control	Incognito Box	Building Inspector	Water Reservoir (fire safety)	Theatre Technician	Tailor
	Ticket Office	Royal Salon	First Aid Room	Water Reservoir (services)	Financial Director	Ironing Room
	Ticket Office Lobby	Royal Stair	Workshop	Supply Room	Creative Director	Ladies Hairdresser
	Day Ticket Office	Archduke's Stair	Carpenters	Weapons Store	Ballet Director	Mens Hairdresser
	Security	Emperor's Stair	Mechanics	Boiler Room	Music Archivist	Shoe Store
			Directors Apartment	Gas Meter Room	General Dressing Room	Music Archive
			Building Inspector's Apartment	Electric Battery Chamber	Orchestra Dressing Room	Loading Bay
				Pump Room	Female Soloists' Dressing Room	
				Air Mixing Rooms	Ladies Choir Dressing Room	
				Ventilation Rooms	Male Costume Dressing Room	
				Liquidatur' (Incinerator)	Ladies Costume Dressing Room	
				Aborte' (Latrine)	Children's Dressing Room	
				Well	General Rehearsal Rooms	
					Vocal Rehearsal Room	
					Choir Rehearsal Room	
					Ballet Rehearsal Room	

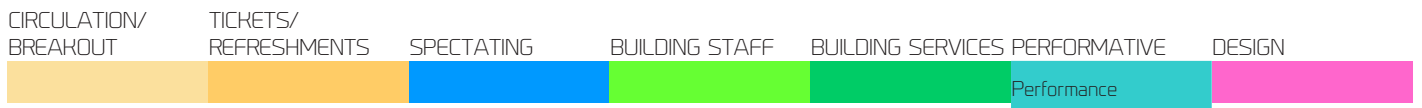
PROGRAMME ANALYSIS: VIENNA STATE OPERA

Source ¹

CIRCULATION/ BREAKOUT	TICKETS/ REFRESHMENTS	SPECTATING	BUILDING STAFF	BUILDING SERVICES	PERFORMATIVE	DESIGN
Foyer	Shop	Main Stage Floor	Administration	Plant	Main Stage	Assembly Hall
Courtyard	Restaurant	Balconies Main Stage	Central Cleaning	Plenum	Orchestra Pit	Scene Painting
Public Gallery	Brasserie	Balconies Second Stage	Company Health Service	Technical Balcony	Substage	Metal & Wood Workshop
Cloakroom	Cafe	Monitor		Storage	side stage	Costume
Classroom	Ticket Counter			Set storage	back stage	Sewing
Opera Street (Dividing Axis)					Second Stage	Hat & Mask
					Second Substage	Wig & Make-up
					Studio Stage	Archive
					Set Design Office	Loading Bay
					Ballet Offices	
					Orchestra Office	
					Choir Offices	
					Library	
					Reception	
					Sponsor Department	
					Statsbygg Offices	
					Opera Dressing Room	
					Orchestra Dressing Room	
					Ballet Dressing Room	
					Central Dressing Room	
					Guest Dressing Room	
					Extras' Dressing Room	
					Children's Dressing Room	
					Lysgard (Backstage Village)	
					Opera Studio	
					Ballet Studio	
					Song Studio	
					Orchestra Studio	
					Orchestra Hall	
					Cantine	
					Green room	

PROGRAMME ANALYSIS: OSLO OPERA

Source ²



ad nihilum

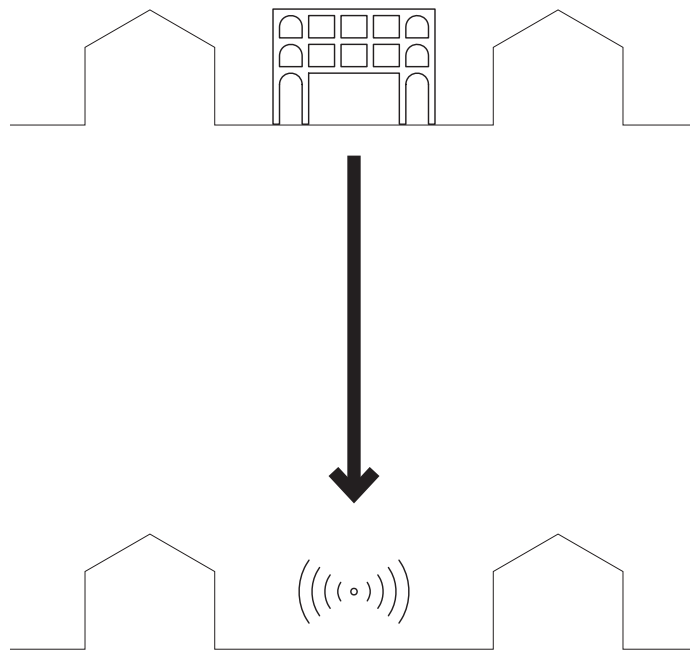


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PROGRAMMATIC CONCEPT: FUTURE OPERATIC

PERFORMANCE SPACE + AUXILIARY FUNCTIONS + BUILDING SERVICES



PURE PERFORMANCE SPACE

THE WORLD OPERA



The World Opera is a significant step towards the future of music theatre performance. More than Van der Aa's Sunken Garden, The World Opera actually inhabits digital space. Whereas the Sunken Garden uses an abstract perceived dimension to create an illusion of space, the World Opera is performed across digital space and reconfigured into physical space. The key aspect of the project is its network and streaming capacity, which opens up seemingly infinite range of possibilities for distributed performance. The problem with this high performance technology is its lack of mobility, meaning that the World Opera must be confined to conventional performance spaces to accommodate the necessary broadcasting facilities.

"It is our wish to provide all citizens access to a warm and compelling universal experience, offering individuals a greater understanding of themselves and others, as well as awareness of their part in our rich and vibrant global community.

Central to this mission is the World Opera House, a meeting place for cultural discussion, development, and performance. As a truly global forum, the World Opera House cannot be a single space, limited to one location or time zone. Rather, the World Opera House is a network of interconnected performance spaces that allow for the real-time interaction of performers across high-speed networks.

As a collection of performance sites distributed throughout the world, the World Opera Stages provide the technology necessary to mediate time and space. Through dedicated high-speed communication networks, we are able to connect performance over great distances with low-latency, high-definition audio and video streams."³

Niels Windfeld Lund & Jason Ernest Geistweidt



upper left ⁴, lower right ⁵

TECHCOOLTOUR

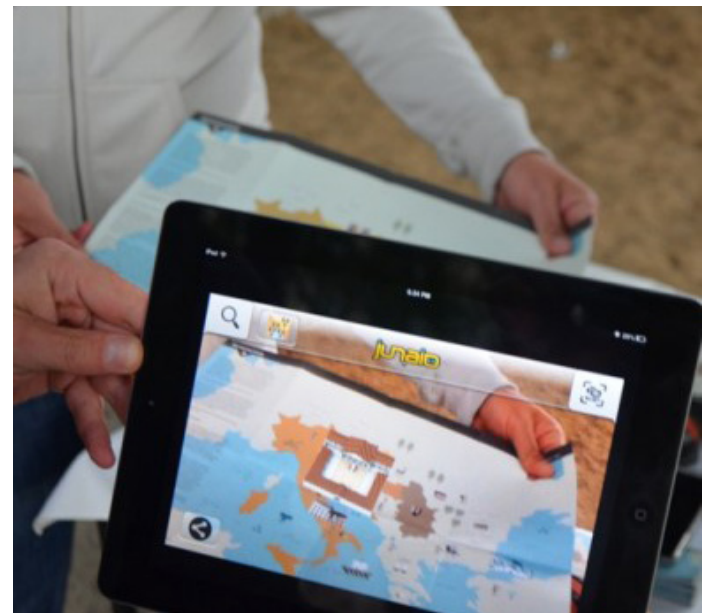


The Techcooltour project promotes two EU Cultural Routes using purpose-developed ICT tools, pioneering new media possibilities in the promotion of cultural heritage. Twelve archaeological sites in four countries are fitted-out with augmented reality info-boards. When viewed through a smartphone, the boards trigger virtual presentations and offer additional information to visitors, transforming the sites into virtual museums.

The reason why the project is groundbreaking and particularly relevant to the Future Operatic is that it creates virtual museum space that eliminates to a certain extent the need for a physical exhibition space. Based on parallels between the museum and the opera house, a similar digital environment may serve as a substitute for the opera house.

"Techcooltour is a crossmedia platform created within the "Tech Tour: Technology and Tourism: Augmented Reality for Roman and Byzantine itineraries" EU funded project, with the aim of offering innovative and engaging experiences at archaeological locations and cultural heritage sites. This EU project aims to promote two historical trans-national EU cultural routes exploiting developed ICT tools and exploring new media potential in presentation of historical heritage." ⁶

Jana Rodic & Marko Todorovic



upper left ⁷, lower right ⁸

5. WHAT IS THE
ROLE OF OPERA
IN SOCIETY?

THE ORIGINS AND DECLINE IN POPULARITY OF THE OPERA

The combination of music and structured literature which can be roughly equated to opera first appeared in Florence in the 16th century. The *stile rappresentivo* was an intermediate between spoken word and song.

'The first poem to be sung on the stage in *stile rappresentivo* was the story of *Dafne*, by Signor Ottavio Rinuccini, set to music by Peri in few numbers and short scenes and recited and sung privately in a small room.'¹

Oration Music in Florence I: Recitar Cantando 1583-1655

The historical format is more precisely known as *intermedio*, a precursor to masque and a lighter form of entertainment relative to the more serious art of the play.

'Rinuccini's *Dafne* is based on his *Combattimento di Apollo col serpente Pitone*, an *intermedio* performed in 1589.'²

Dafne, the First Opera. A Chronological Study

Although performances were initially restricted to private performances for court audiences, when opera spread to Venice in the early 17th century it broke out of the confines of its aristocratic patronage and became commercially sustained public entertainment and part of the Carnival celebrations, a season of street parties and games. Facilitating the emergence of Venetian opera in 1637 was the first public opera house, Teatro San Cassiano, which we might consider the pivotal piece of

civic architecture that catalysed the development of new forms of art, namely music theatre.

'The Venetian audience consisted of all social classes.'³

A Social History of Music: From the Middle Ages to Beethoven

'By the late eighteenth century and in the nineteenth century the opera played a preeminent role in the cultural life of Europe. The opera was enjoyed and understood by a broad cross-section of urban Europeans and Americans. The opera house became the meeting place of all social classes in society.'⁴

The Opera: The Meeting of Popular and Elite Culture in the Nineteenth Century

So what happened in the last 380 years that critically alienated the general urban population from the operatic form of music theatre and left the city with an antique art form consumed by the elite, the bourgeoisie and the eccentrics?

'To turn opera into "high culture" it had to be withdrawn from the everyday world of popular entertainment, especially from the heterogeneous dictates of the market and the commercial reach of cultural entrepreneurs.'⁵

Culture and Power in Cultural Studies: The Politics of Signification

The results of such cultural intervention are present in the architectural programme of the opera house. Built in 1966, The New York Metropolitan Opera House has a seating capacity of 3,800 and a standing capacity of 175. The Teatro Colón in Buenos Aires built in 1908 has a seating capacity of 2,487 and a standing capacity of 1,000.

This programmatic shift in architecture was reflected in aesthetic shifts in fashion and linguistic shifts in journalism.

...worked to sharpen and objectify a code of behaviour, including a dress code, deemed proper when attending the opera. Upper-class New Yorkers increasingly insisted that only foreign language opera could meet their standards of excellence - standards upheld by behaviour and criticism employing foreign words and specialized language impenetrable to all but the cognoscenti⁶

New York Operagoing 1825–50: Creating an Elite Social Ritual

Opera was turned into an exclusive form of art entertainment and its trans-societal universality revoked.



'A parallel process of differentiation had also been occurring in England, where the pre-industrial cultural pursuits, enjoyed on a cross-class basis, were gradually replaced by a class-specific culture, the high arts of music, theatre and literature being the province of the upper-middle and middle classes, and the popular cultural forms of music hall, organized sport and popular literature providing the entertainment of the lower classes.'⁷

Music and Society: The Politics of Composition, Performance and Reception

upper right⁸, lower left⁹

CONTEMPORARY MUSIC CULTURE

If 17th and 18th Century opera was a form of musical entertainment widely appreciated and understood in the sense of a common language by people from all social classes, what then is its present day equivalent? What is the most common way that people consume music in a social environment? Consider the nightclub. 66 % of 18-30 year olds and 82% of 18-24 year olds go clubbing at least once a month (according to RNID/AOHL Research 2009)¹⁰. To illustrate how high this figure is, let us compare it with another common pastime, sport. Only 63% 16-34 year olds exercise or play sport at least once a month (according Department for Culture, Media and Sport 2010)¹¹. Although these statistics can be interpreted in a number of ways, I would like to simply relate them to the idea that both sport and clubbing belong to the category of 'body culture'.

"It was argued that contemporary body cultures have evolved as a response to the distanciation from the body that characterized the civilizing process and the Cartesian body-mind dualism of Western modernity... Although it is the ground of experience and is always a field of lived sensation, it ordinarily fades and recedes from our awareness when engaged in purposeful actions and daily routines. Contemporary societies offer a number of occasions (eg. sport, massage, alternative medicine and body therapy), where the body is made a thematic object of attention and is turned into an active presence of 'Erlebnis' and a medium for authenticating identity (Rittner 1983). The dance club is clearly an institution that provides opportunities for body-related and body-focused experiential consumption, although this is not necessarily framed by the quest for authenticity."¹²

Silvia Rief

Clubbing as a common body culture however, does not necessarily give it validity as a common art language, and while dance music is no longer an underground phenomenon, proliferating unavoidably throughout mainstream popular culture, contemporary electronic music culture is viewed by many as the antithesis of the arts, the contemporary nightclub its unsophisticated post-industrial vessel. The repetitive nature of heavily sequence based music and the absence of conventional musicians in the venue make many sceptical of the artistic value and aesthetically distances them from so called dance music culture. This is in no small part due to the fact that from the very onset of its popularisation, electronic dance music was produced specifically for dance clubs. It often sounds somewhat uncouth in less a energetic environment. It is an extremely contextual form of music and one thing we must acknowledge in our review of contemporary music culture is the synergy between architecture and music. The nightclub, like all other music venues throughout time, has had a profound influence on music production.

"I've played the Disney Hall here and Carnegie Hall and places like that. And it's been very exciting. But I also noticed that sometimes the music that I had written, or was writing at the time, didn't sound all that great in some of those halls. We managed, but sometimes those halls didn't seem exactly suited to the music I was making or had made."¹³

David Byrne

The architecture of the nightclub, however, does not perform an strictly musical function. Like the opera house it has a prominent social function that supports processes both within and outside of its walls.

"The dance club... as an 'other-worldly environment' (Thornton 1995:21), where the structures of everyday life are temporarily suspended through thresholds that separate the visitors from daily routines, education, work and family commitments; where social identities are undone and new identifications and roles are taken up and played with; where social boundaries between groups dissolve and where participants act out transgressive, carnivalesque bodies." ¹⁴

Silvia Rief

The dance club and its associated music and culture combined make up something complex and multi-dimensional that extends beyond the borders of entertainment, providing a social music ritual where a 'set' ranging from three to nine hours is consumed in the manner of a journey through a sequence of atmospheres, varying in style and intensity in accordance with the collective response, often generating a sense of deeper narrative. These rituals construct a portal through which one can experience phenomenon resembling the traditional notion of beauty.

"We all know what it is like, even in the everyday world, suddenly to be transported by the things we see, from the ordinary world of our appetites to the illuminated sphere of contemplation. A flash of sunlight, a remembered melody, the face of someone loved - these dawn on us in the most distracted moments and suddenly life is worthwhile. These are timeless moments in which we feel the presence of another and higher world." ¹⁵

Roger Scruton

These transcendental properties of acoustic space, however, are more often exploited for commercial purposes, rather than in the name of beauty. The synthetic sound environment as a means of transcending everyday reality infiltrated the everyday reality itself far earlier than electronic music. As early as the 1970s Albums such as "Sounds For The Supermarket" that were intended to increase buyer purchasing in shops were available via mail order purchase to supermarket venders.

"Sound and music have become central to people's daily activities, especially of the young. Music accompanies the move through shopping and leisure spaces. It is used to stimulate emotions, atmosphere and sociality, to affect the length of stay in service spaces, and it prompts people to latch their movement practices onto it." ¹⁶

Silvia Rief

AMON TOBIN

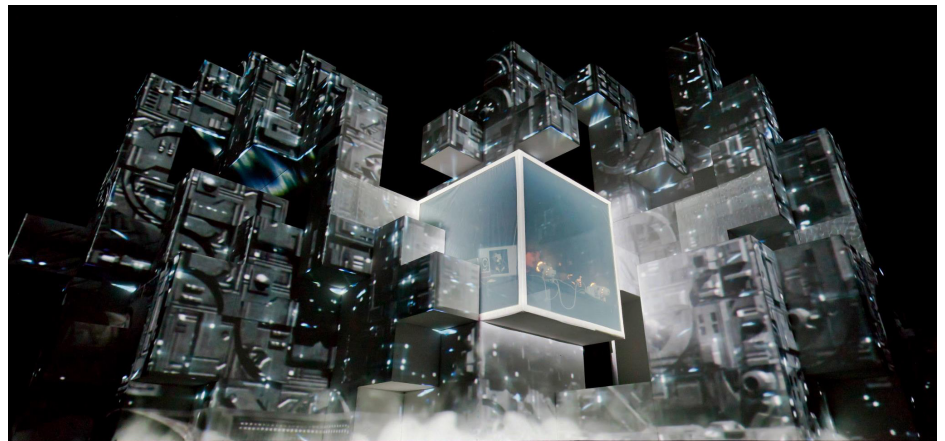


"It's a genuine mixture of movie experience, a live performance, and music. I'm trying to be part of a much bigger thing.

The show is the result of this problem-solving process. I wanted to visually interpret what people could hear in a way that was more than some fancy eye candy. Instead, I'd perform the music inside an invented object that could shape-shift to a narrative—a kind of live movie that reacts to the score."¹⁷

Amon Tobin

What Amon Tobin's live show demonstrates is a hybridisation of different art forms and a meshing together of their associated spatialities. The venue is no longer clearly definable as a club or a theatre, but something in between. The art form has driven a typological diffusion. This is an example of something emerging from the demands of contemporary music and art aficionados, allowing mainstream club audiences to exercise a degree of connoisseurship, allowing art to be dictated by quality and not by genre. This is important to the Future Operatic as it uses the term 'opera' as a means of accessing new concepts, without necessarily adhering to its associated conventions.



upper left¹⁸, centre right¹⁹, lower right²⁰

JEFF MILLS



Jeff Mills was one of the early pioneers of techno music. He has also been labelled a 'space enthusiast' who sees techno music as a means of describing futuristic spaces for which we currently lack a linguistic convention. Heavily influenced by science fiction, Mills sees his work as narrative and cinematic - terms frequently associated with the design of architectural experiences.

He has retro-produced soundtracks for many science fiction films in order to explore these specific qualities of techno music which transport us to synthetic environments. His attempts to improve the linguistic accuracy of these accounts of space have led him to the conclusion that a continuous frequency spectrum penetrates deeper into our imagination than the intermittent steps of classical notation. That said, Mills has also performed with live orchestras, exiting the boundaries of underground techno music and entering a much more intellectually accepted art sphere.

In the context of the Future Operatic, Mills' work demonstrates how we can strive to establish new linguistic conventions in uncharted environments, in Mills' case the science fiction, in the case of the Future Operatic the digital present. It also demonstrates how multi-disciplinarity and the use of (and/or reference to) classical art forms can bring more obscure forms of practice to new audiences as well as to the attention of the mainstream.

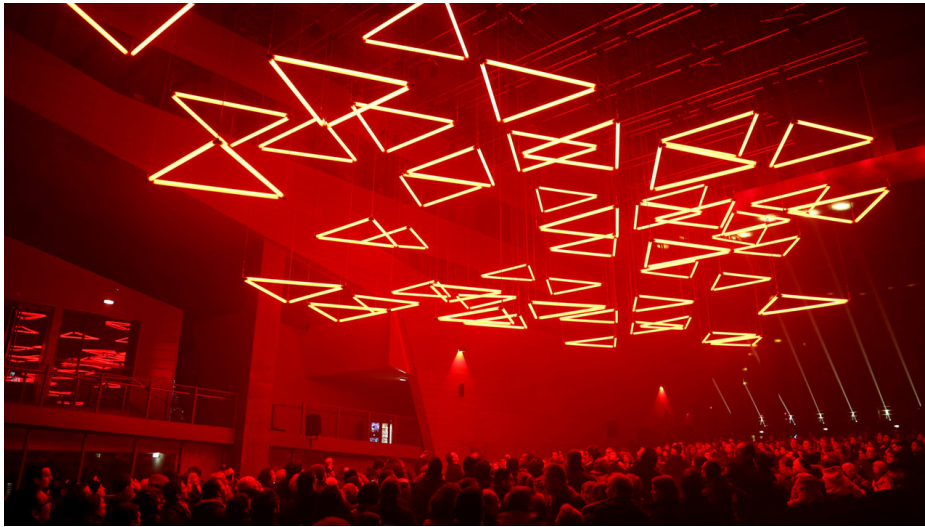
"Well, like with the idea of overcrowding, population explosions and things like that, I think there won't be any moral way that we can deal with that, we'll have to try and find ways to change the impression of that reality. So the idea of simulating reality might become as common as taking aspirin for a headache, or taking cold medicine for the flu, that it's a temporary fix. So it gives you the illusion that you only see every other person, but actually there are four times as many people around you. Or things that will give you the illusion that things are okay, but actually it is not."²¹

Jeff Mills



upper left²², lower right²³

ROBERT HENKE



Although Henke is the professor for sound design at the Berlin University of Art, his work embodies much more than the acoustic. Objects, light and sound are configured together in a spatial composition - a transient piece of architecture. It is for this reason that his work is relevant to the Future Operatic.

The architects of the future must master emerging new types of space, without confining themselves to the physical or the climatic. These experiments into digitally engineered experiences must feedback into our understanding of architectural design.


"I provide the audience experience by using multiple channels which place the listener in a field of sound that is much bigger than the physical room defined by the speakers and the walls. I develop my own tools for performance. I explore acousmatic concepts, ambisonics, and wave field synthesis for diffusion of sound in space.

The composer acts as a controller, a conductor and a system operator, defining which element needs to be placed where on a timeline. This process is of an entirely different nature from actually performing music, since it is a non-realtime process, and is therefore much closer to architecture, painting, sculpting, or engineering."²⁴

Robert Henke



upper left ²⁵, lower right ²⁶



6. HOW DOES
THIS PROJECT
APPROACH THE
OPERA?

OPERATIC CONCEPT

The project reduces opera down to the following fundamental concepts:

libretto - a narrative (italian: little book/latin: liber)

aria - an atmosphere (italian: air/latin: aer)

opera - a composition (italian: work/latin:opus)

NORDIZK

Nordizk is a piece dystopian architectural fiction telling the story of members of a research community investigating the effects of online living who become a city of battery consumers trapped in a totalitarian intranet.

It explores ideas of voluntary segregation, the information state, augmented urbanism and the ethical dilemmas of our reliance upon digital technology with regard to space.

The piece not only provides the project with a 'client' from which programmatic parameters can be derived, but is also a conduit to explore the key architectural themes of the project by artistic means, and as such is a fundamental part of the architectural investigation.

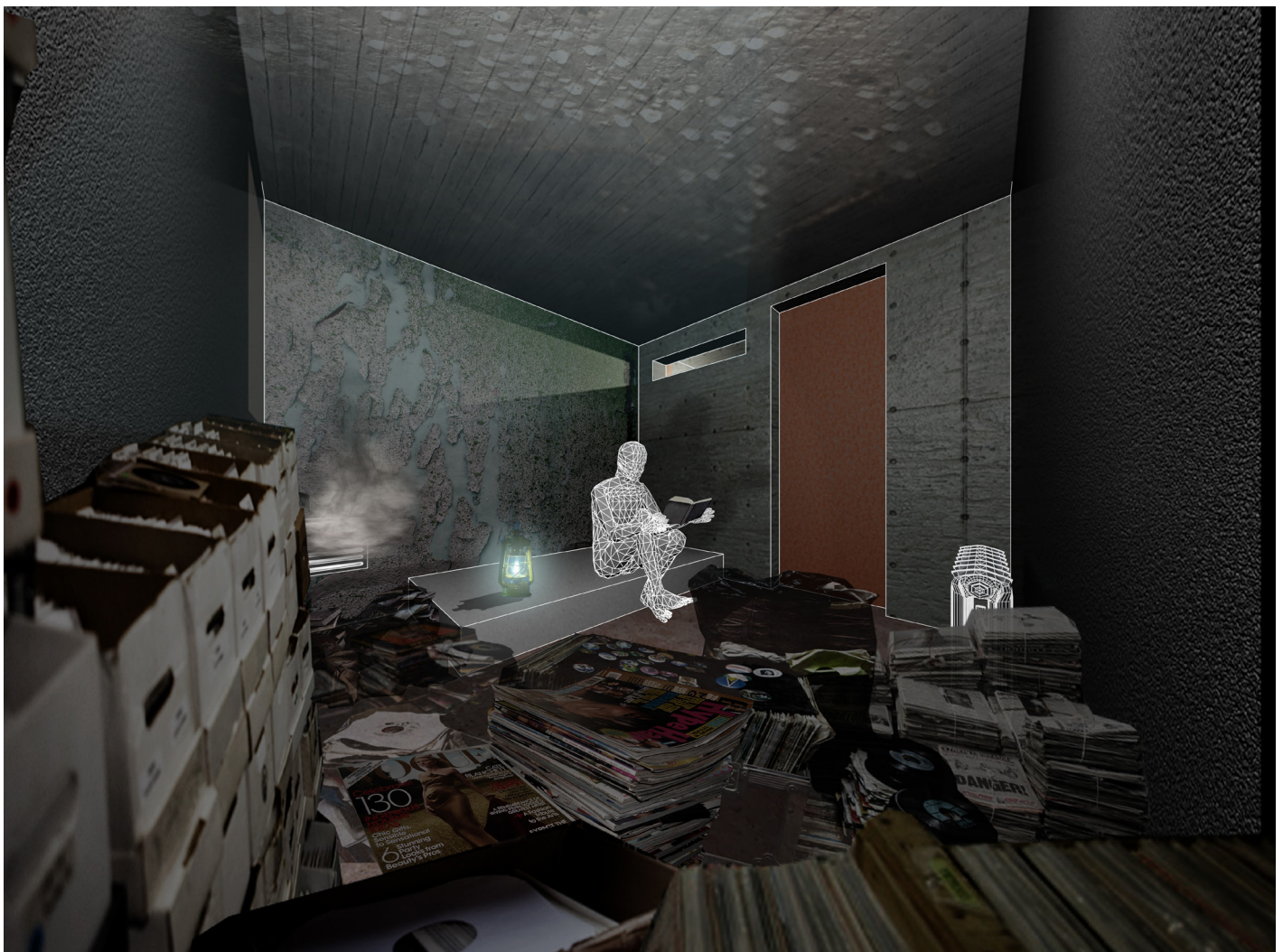
- First a narrative was written to develop and explore various concepts.
- Then the scenography was derived from the text to give form and texture to the ideas.
- Finally the score was derived from the images to transform the spaces into a sequence of atmospheres.

The score as it appears in this book is a translation of the original electronic score into conventional notation and as such may contain inaccuracies.

Text, Images & Music: Brian Hoy

Ilenia watched the green pattern on the back of her eyelids slowly fade, opening her eyes again to recharge her retinas from the second hand fluorescent light that jutted through the slotted window two metres above. The murmuring in the corridor was easy to block out because the dialect was something unintelligible that only those patrolmen with heavy boots and helmets could speak or understand. The smell on the other hand was more difficult to ignore. Her hunger grew with every inhalation as the cooking exhaust from the stack of apartments below seeped in through the grill that was, ironically, intended to ventilate. Ilenia felt as if she was in some kind of bamboo steamer, leading a dim sum existence in this stack of small compartments whose porosity amplified all domestic activities that were taking place below. She could recall every meal that the family below had eaten in the last week, but they had never spoken with one another.

Most of District F was the same porous construction, built by the government as a temporary solution, the promised upgrade never delivered. Nevertheless, despite the infiltrating smells and noises and the aggressive patrols, it satisfied Ilenia's most important desire; a life offline. For her, living



EXTRACT FROM THE SCORE "DOM ILENZIA"

Andantino

21

4x

4x

Iron Pipes High (droplet 1)

Iron Pipes Low (droplets 2)

Stones High (droplet 3)

Stones Low (droplets 4)

Drumset (metal)

Drumset (light)

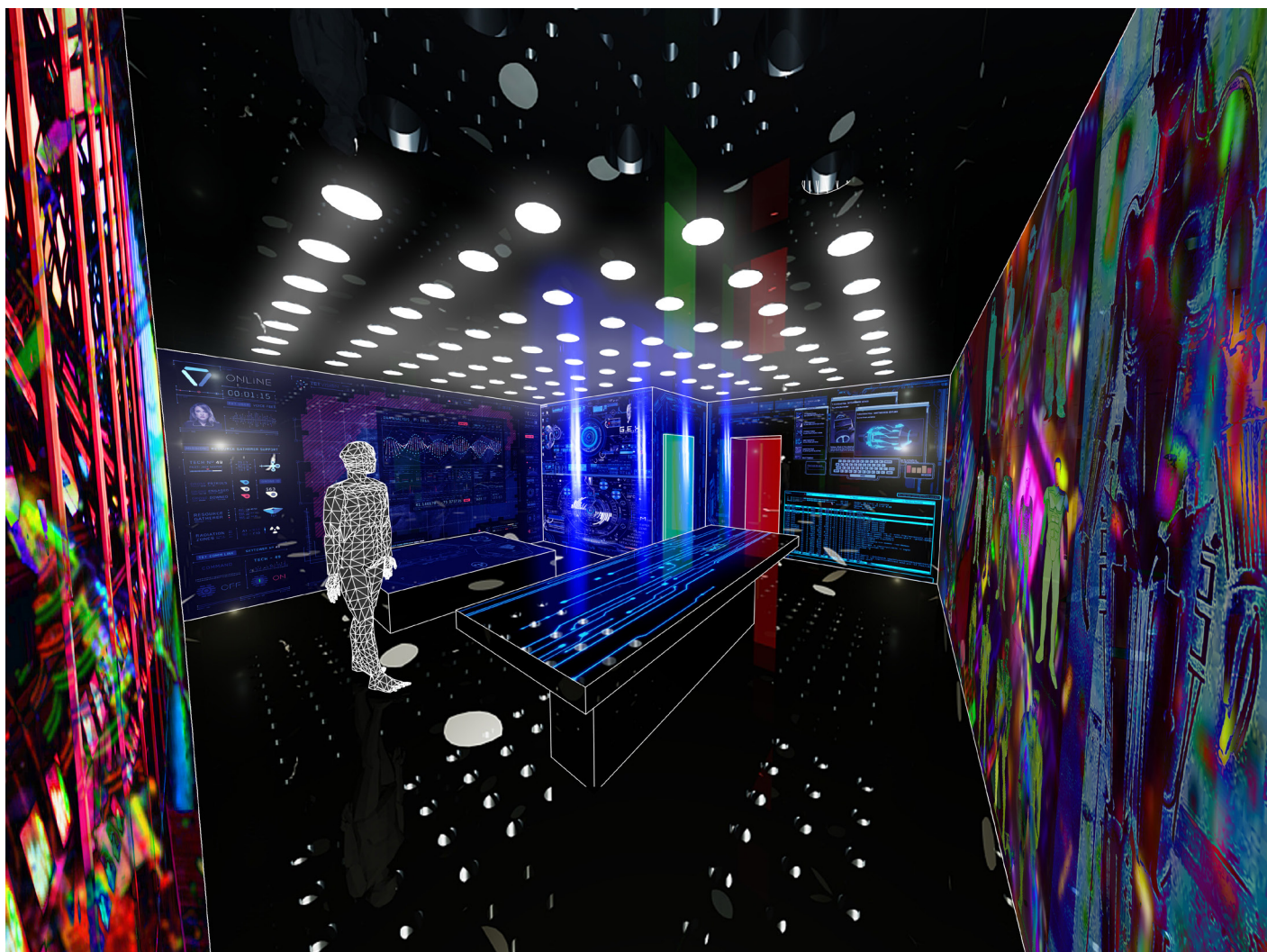
Timpani (bass drum)

Drumset (classic)

Voice (paper rustling)

Voice (violent shouting)

Detailed description: This musical score is for the 'Andantino' section of 'Dom Ilenzia', starting at measure 21. It features nine staves. The top staff, 'Iron Pipes High (droplet 1)', has a 4-measure phrase with a repeat sign and a '4x' marking. The second staff, 'Iron Pipes Low (droplets 2)', has a 4-measure phrase with a repeat sign. The third staff, 'Stones High (droplet 3)', has a 4-measure phrase with a repeat sign. The fourth staff, 'Stones Low (droplets 4)', has a 4-measure phrase with a repeat sign. The fifth staff, 'Drumset (metal)', has a 4-measure phrase with a repeat sign. The sixth staff, 'Drumset (light)', has a 4-measure phrase with a repeat sign. The seventh staff, 'Timpani (bass drum)', has a 4-measure phrase with a repeat sign. The eighth staff, 'Drumset (classic)', has a 4-measure phrase with a repeat sign. The ninth staff, 'Voice (paper rustling)', has a 4-measure phrase with a repeat sign. The tenth staff, 'Voice (violent shouting)', has a 4-measure phrase with a repeat sign. The tempo is marked 'Andantino' and the time signature is 4/4.



in a cramped box filled to the ceiling with personal belongings, not just of her own, but of old friends who had become subscribers, was a small price to pay for keeping the spirit of what all this junk represented alive. Even though she could only partially open the door; even though the room itself was beginning to develop a potent stench as a damp library of discontinued publications began to smell distinctly like it was concealing at least one dead rodent.

002

Four levels of dense urban infrastructure above, in District B, the city's inhabitants were not even aware that any newspapers or magazine still existed, let alone that some people still held onto such relics with a valiant sense of purpose. The term 'artefact' had long since been manipulated to mean a short documentary-style piece of entertainment that could be downloaded and thereafter collected in order to improve and monitor one's cultural-historical knowledge. More importantly the collection would be visible on one's profile as an indication of how well cultured a person is.

Korsav had almost seven hundred and fifty artefacts. They gave him a sense of satisfaction. They made him feel like he was a better citizen than those who had fewer, somehow more responsible. For Korsav artefacts were an

EXTRACT FROM THE SCORE "DOM KORSAV"

Andantino

8

Koto (japanese)

Harp (little step)

Celesta (bleep)

Drumset (light)

Low Tom (bass drum)

Voice (low freq osc)

Voice (typing noise)

Detailed description: This musical score is for the piece "Andantino" from the album "Dom Korsav". It features seven staves. The top staff is for Koto (japanese), starting at measure 8 with a treble clef and a key signature of one flat. The second staff is for Harp (little step), also in treble clef and one flat. The third staff is for Celesta (bleep), in treble clef and one flat. The fourth staff is for Drumset (light), in common time. The fifth staff is for Low Tom (bass drum), in common time. The sixth staff is for Voice (low freq osc), in treble clef and one flat. The seventh staff is for Voice (typing noise), in treble clef and one flat. The score includes various musical notations such as eighth notes, sixteenth notes, and rests.

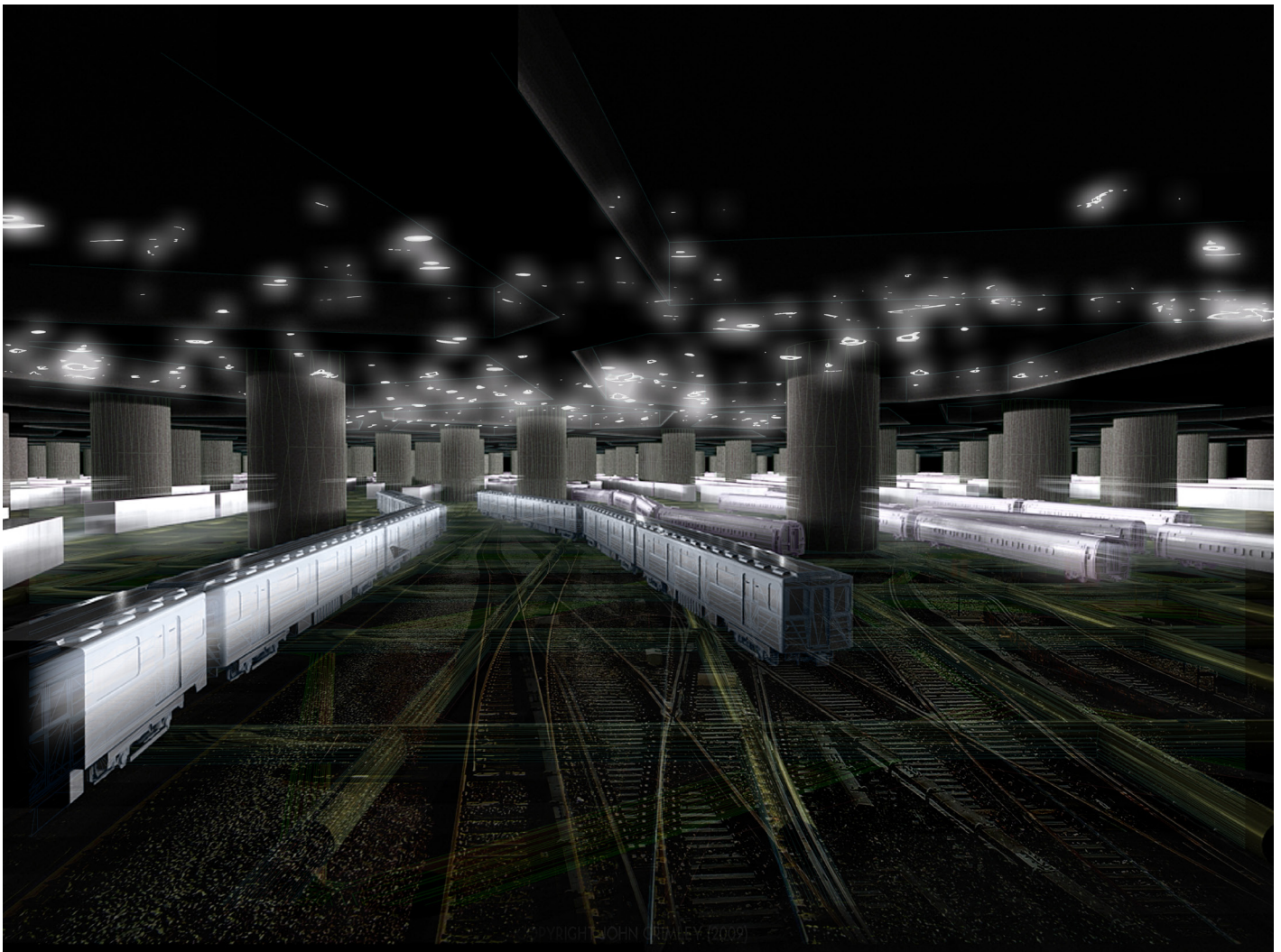
important way of understanding human culture and therefore an important way for citizens to understand each other. The fact that this feeling could be bought and downloaded did not stop Korsav from expanding his artefact collection with genuine enthusiasm. He even saw it as a noble pursuit, not the matter of implied wealth. Korsav digested his culture on a suitably classy device that borrowed the material of handmade watches and leather-bound telescopes, reflecting the content of the romanticised histories presented in the artefacts themselves.

The device plugged into the wall, flat like a framed picture. Most of Korsav's belongings were stored like this, mounted into a slick utility surface that charged all electrical devices, but who's primary function was to display the lifestyle of the resident to any guests.

Korsav picked up his artefact reader and headed out of his apartment. As he crossed the threshold, the glass security curtain fell vertically behind him without a sound. By the time he had turned around to face it, its interactive surface had already booted up; its dark sheen transformed in an instant to a hyper-illuminated array of blinking, scrolling, swooshing features. This was the outward facing facade of Korsav's home. Not only did it display things like his artefact collection, the alumni networks he had a paid subscription for and his favourite information sources, it also followed Korsav's activities in real-time, showing where and what he was doing at any given moment. This incentivised him to stay on top of the local cultural scene, going to store openings, gallery vernissages and anything that would keep his profile, and thus his social life, healthy. He used this profile to monitor his lifestyle, to make sure he wasn't letting life slip away from him, unlike other subscribers who were only concerned with showing off. He found contentment in his profile and the principles on which he maintained it, as he strolled away into District B's maze of pulsating coloured lights. Without looking back, he could feel his profile growing smaller and smaller, blending into the thousands of other animated facades. Even this thought made him proud to be doing his small bit to make District B the most desirable young subscriber neighbourhood in the city of Nordizk.

003

Ilenia and Korsav had both grown up in Nordizk. Both had an emotional attachment to the city, a sense of responsibility and civic pride. If Nordizk had a unified anthem they would undoubtedly both stand to sing it, but Nordizk was divided, a bipolar city. Its population was voluntarily segregated. Below District D was a membrane that ran horizontally through the whole city. From the districts above it did not appear permeable, a bed of dangerous, untraversable transport infrastructure, shearing the city to an abrupt, black close. From underneath its holes and perforations were made visible by the lights above and the dense mesh of transport lines became a canopy, that



with some amount of caution and skill could be penetrated in order to trade, steal or simply observe the foreign entity that loomed directly overhead.

Beneath it all lay the cold water of the North Sea, but for the majority of the city it was not visible. Daylight was brought in vertically where needed or paid for in precision engineered conduits. There were no vistas or avenues in Nordizk. Whether you were in the slums below 'the meniscus', as it was known, due to the popular misconception that it was where the city ended and the sea started, or high up in District A, where the richest residents might conceivably be able to afford direct access to the sky, one thing governed Nordizk totally and ominously - its density. Density overruled everything. Money, power or social status all had to bend to density.

Ilenia cooked, ate and slept in a seven square metre compartment with a communal toilet and shower block shared between thirty compartments. Korsav's apartment was twenty-five square metres with the latest living tech suite installed. The layout felt slightly better than the previous version, although he was not entirely sure what had changed since the last update. The bathroom seemed slightly bigger and the kitchen slightly smaller, but changes between upgrades were always so subtle that sometimes he was uncertain if his entire apartment wasn't slowly shrinking.

EXTRACT FROM THE SCORE "TRANSPORT NIVEAU"

Molto Allegro

5

The score consists of seven staves. The top three staves are percussion: Ratchet (hat) with a continuous eighth-note pattern, Military Drum (snare) with a sparse pattern of eighth notes, and Bass Drum (kick) with a pattern of eighth notes and rests. The next three staves are melodic: Horn (pads 1) with a few notes, Alto Flute (pads 2) with a sustained note, and Piano with a complex accompaniment in both hands. The bottom staff is Thundersheet (train noise) with a sustained note. The key signature has four sharps (F#, C#, G#, D#) and the time signature is 4/4.

Ratchet (hat)

Military Drum (snare)

Bass Drum (kick)

Horn (pads 1)

Alto Flute (pads 2)

Piano

Thundersheet (train noise)

Ilenia hadn't seen the sea for weeks. She worked near the meniscus, buying and selling scrap technology from the online districts above to experimental offliners below, mostly for educational purposes. The money was poor, seeing as demand was primarily based on curiosity and people were very wary of incoming technology, having seen so many friends and loved ones disappear into the online above. Nevertheless, there was enough reasonable discussion to warrant the development of an informed opinion on what was best for peoples' children or for the care of the elderly. Ilenia typically provided household devices, out of date application-based hardware, old doors and air-con units to the offline community. It was quite saddening, handling objects that could be very easily misinterpreted as indicators of a better life, so she tried to visit the seas as much as possible to renew her strength and remind her of why she did what she did.

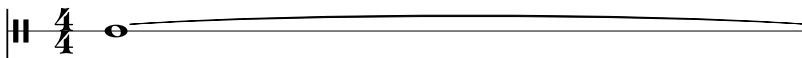
She knew of only one secret path to get there. Such knowledge was only shared amongst family and very close friends of the family. Because secrets could not be kept above the meniscus, such pathways no longer existed there. They had all been located and blocked and besides, the subscribers soon lost their awareness of, and their urge to connect with, the environment outside of the electronic. As a result of this connection being overwritten by



EXTRACT FROM THE SCORE "SEA PASSAGE"

Andantino

Thundersheet
(ocean noise 1)



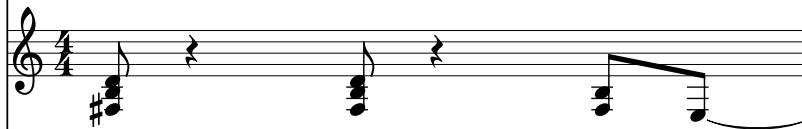
Marimba
(stones 1)



Alto Kalimba
(stones 3)



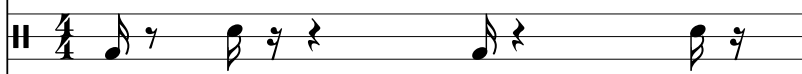
Marimba
(stones 3)



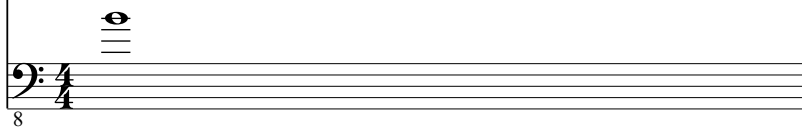
Drumset
(extended)



Drumset
(compact)



Double Bass
(ocean noise 2)



online alternatives, the offliners' visit to the sea had, over the last half century or so, become an increasingly sacred ritual that, if only in a symbolic way, defined them.

And so, from the small aluminium shed that she traded out of, receiving pirated merchandise and scrap goods through a hatch in the ceiling and selling through a similarly surreptitious hatch in the wall, Ilenia shut up shop and set off for the sea. It was physically difficult to climb and squeeze through the gaps and vents and she knew there would come a time when she would not be able to make it anymore, but for now she shuffled along edges and hopped across voids, listening with intense concentration for patrols nearby.

The patrols were not out to beat or arrest members of the offline community. Instead, their job was to convert or persuade them to become subscribers. This often meant beating and arresting them anyway, because every conviction meant a guaranteed subscription, but on the most part the job of the patrols was to eliminate all reasons to remain offline. Ilenia's route to the sea was one of those treasured reasons and it would only take a simple metal grill or a few breeze blocks to render it unusable. From the severity of the path's endangerment came something spiritual for Ilenia. Not only did she tread with caution, but respect.

As the tendrils of sea air began to reach Ilenia's senses, she broke her silent concentration with song. It was a song her parents used to sing at this point as they approached the opening together. The song was not inspired by the sea. It was conducted by the sea; the man, woman or child just an instrument compelled to release its sound. The pitch and meta of the melodic mantra were the swell and undulation of blue, green, grey and black, solidifying into a single steady foundation, the trustworthy horizon a low hum that gave every fleck of reflected sunlight and the crest of every wave an ultimate belonging. It was too dangerous to lean over the edge to see the gnarly fingers of the tide first batter and then lap against the huge steel legs of Nordizk. The vertical plane was rigged with motion sensors in order to detect openings in the building envelope, but closing her eyelids slowly and calmly, Ilenia travelled down to the water. First deciphering the reverberation of the recess in which she was sitting so that she could only hear the distance between the recess and the surface of the water, she ironed out the delays and distortion of the wind that faded the lower frequencies of the crashing waves, until in her mind she could hear their full acoustic spectrum.

She inhaled, returned her vision to the horizon and departed.

Korsav arrived at work on time. Although his supervisor was pleased, Korsav was nervous. To arrive even the slightest bit early could arouse suspicion that one had not correctly absorbed the recommended amount of street media on the way. It was normal to arrive late. Generous allowances were made for the purchasing of products such as anti-fatigue skin chemicals or precision fragrances. It was frowned upon to abstain from purchases and consistent punctuality was considered frugal. Every citizen had a duty to consume and support the economy of Nordizk. Spending time interacting with advertising systems was prescribed by the government as part of a healthy lifestyle. Children needed more than adults, according to experts. Nobody made light of their duty. Shopping as a leisure activity became extinct more than thirty years ago, as government research had shown how unhealthy it was to save or invest, pushing instead a policy of 'Universal Consumption' and instigating a huge drive for lifestyle standardisation

Apartments were physically almost identical throughout a district and citizens were encouraged to refine their residential units through progressive electronic living. In order to achieve this, the Nordizk authorities had slowly shifted the mechanism of personalisation almost entirely to smart surface technologies. Even clothing was constructed from the same base product and cut, enhanced and altered by downloads and apps.

Korsav logged into work and requested a hot-desk. His preferences, his years of service and his merits were already stored on the system and based on this information, combined with his current performance, an appropriate desk space was allocated. Korsav usually got a decent spot for someone of his age. He was good at what he did. What exactly he did, however, he wasn't quite sure. In fact nobody knew what exactly their role was. Everybody had tasks. There was certainly no shortage of tasks, but what the company did eluded them all. The reality of Nordizk, and the company Korsav worked for, was that people could turn up as late as they wanted and it wouldn't make a difference. The hours were just there to give a false sense of value to the subscribers, who were themselves the real product. None of the tasks the subscribers undertook had any purpose whatsoever. Their function in Nordizk was simply to consume as much as possible in the most efficient and dense urban configuration imaginable.

Korsav opened his first task by swiping his right hand across the desktop then tapping once with two fingers, whilst simultaneously ordering an iced fruit-syrup caffeine spritzer with his left. He received a love message with a 2.5 heart-flutter-rating from the girl in the office he had been e-flirting with the day before. A smile spread across his face, through his body, stopping somewhere short of his soul.



006

At the top of Nordizk the skydeck was a battlefield of politics and financial power. Every square metre was another daylight pipe or solar cell that could secure one's social status as a free onliner. Unlike Korsav or Ilenzia, free onliners had an overview of Nordizk and some variable input into the city's regulation. It was the free onliners that for the last fifty years had pushed the policy of universal consumption and lifestyle standardisation, and while it could be argued that those under the meniscus were free from all that, they were trapped in squalor and their way of life was constantly under threat from the patrols. Free onliners resided mostly, with a few rare exceptions, in District A, directly under the skydeck. Almost every one of them provided and controlled, in some part, the very few real services of the city, whilst helping to design the fictional relevance of the subscribers working lives.

District A consisted of slightly larger, more diverse, apartments and although not technically gated was somehow inaccessible. The elevators and access doors were unmarked and would be frequently relocated to maintain a level of exclusivity and security without any formal segregation, thus technically remaining an open and free city. The total surface area of advertising in District A, much like District F, was minimal. Both ends of society understood the reality of the factory floors of mindless consumer existence that lay

EXTRACT FROM THE SCORE "SKY DECK"

Andantino

The score is written in 4/4 time and consists of five staves. The first staff, labeled 'Voice (jet engine)', uses a bass clef and contains a single whole note. The second staff, 'Drumset (low toms)', uses a percussion clef and features a rhythmic pattern of eighth notes with a melodic contour. The third staff, 'Thundersheet (creaking metal)', also uses a percussion clef and includes a melodic line with a slur and a final triplet of eighth notes. The fourth staff, 'Thundersheet (desert air 1)', uses a percussion clef and contains a single whole note. The fifth staff, 'Thundersheet (desert air 2)', uses a percussion clef and features a melodic line with a slur and a final triplet of eighth notes.

between them. What divided these two tribes of Nordizk was the desire of the free onliners to control the city and the daily struggle of the offliners to protect their own way of life peacefully.

The offliners could not fight to liberate Nordizk because the subscribers had committed themselves of their own free will, sick of the slums, sucked in by the propaganda, hypnotised by glimpses of the sleek hyper-coloured digital-dynamic imagery. Even though many offliners had deep sympathies for those who had ascended through the meniscus, never to come back, it could not be convincingly argued that there was any trickery involved. The lifestyle of a subscriber was indeed that of the image projected through propaganda. They were without question 'living the dream', but it would be more accurate to say that they were living inside a virtual environment, defined and controlled by someone else, serving unknowingly as slave labour in one of the largest industrial plants in the world. The product, the battery cultivated e-consumers themselves, were fed by the sale of their own data and the auctioning off of Nordizk's vast labyrinth of advertising space.

Immediately under the quiet power haven of District A, the machine hall of Nordizk whirred away. It had come into existence one hundred years ago as a research community for digital living. Back then the project, a disused oil rig that was gradually extended as its population grew, focused on exploring the notions of personal identity and self-expression in the digital realm though the development of an entirely blogged environment, free from the conventional urban framework of its day. Due to limited space and budget, the researcher-bloggers began to compartmentalise what little volume they had very densely, making as many video walls as possible so that the streets and shops of Nordizk would compensate for their dense repetitive grid. Through the superficially heterogeneity of the electronic panels that never looked the same on any two different days, an illusion of a diverse and boundless digital environment masked a rigidly oppressive physicality. This surface treatment was later made obligatory by law as a way of bringing everyone onto the same level, similar to the way that people maintain the front gardens of their houses in order to create a happy vibrant neighbourhood. All residents were required to ensure the physical shortcomings of the environment did not hinder the city's infinite digital potential. A dormant blog wall or an offline unit could bring a sense of depression to a neighbourhood, financially and emotionally. The underlying motivation was simply to mask the reality of daily life in Nordizk by preventing people from seeing it.

At the time this legislation was passed, an opposition group was formed demanding that there should be a reserved offline zone where people could orientate themselves and remember the original goals of the project: research designed to further our understanding, not an ultimate farewell to the analogue.

Unfortunately the small digital commune that was intended to reflect upon and feed back into Europe's exponentially growing online living culture had already fallen into the resourceful and opportunistic clutches of big business. Those opposing the new law were offered their reserved offline zone, the part of the city that would become District F, without being informed that it would soon be severed from the main volume of Nordizk by the transport deck.

The population slowly crystallised into separate communities of free onliners and subscribers. The environment of the subscribers accelerated towards a total virtual existence, the bare skeleton of Nordizk's brutal industrial framework more a docking station for human lives than architecture in its materially and spatially humane sense.

007

Korsav closed his hot desk and left the work centre as soon as his tasks for the day were completed. His body moved slowly and linearly whilst his mind followed his eyes, meandering far and wide, racing through music blogs, fashion apps, quotes of the hour, sustainably sourced software and environmentally friendly water. He stopped at a hair salon and swiped his palm across a scanner, opening his profile on the left and an options menu on



EXTRACT FROM THE SCORE "COMMUTE"

Andantino

The score is for the piece "Andantino" and consists of nine staves. The tempo is marked "Andantino". The key signature has one sharp (F#) and the time signature is 4/4. The instruments and their parts are:

- Harp (melody 1):** Treble clef, 4/4 time. The part consists of a single sustained chord in the first measure.
- Violoncello (melody 2):** Treble clef, 4/4 time. The part consists of a single sustained note in the first measure.
- Sitar (rhythm):** Treble clef, 4/4 time. The part features a continuous eighth-note rhythmic pattern.
- Alto Saxophone (accent):** Treble clef, 4/4 time. The part features a melodic line with accents on the notes.
- Drumset (percussion):** Percussion clef, 4/4 time. The part features a complex rhythmic pattern with various drum sounds.
- Drumset (light):** Percussion clef, 4/4 time. The part features a light, syncopated rhythmic pattern.
- Drumset (wood):** Percussion clef, 4/4 time. The part features a wood block-like rhythmic pattern.
- Drumset (simple):** Percussion clef, 4/4 time. The part features a simple, syncopated rhythmic pattern.
- Double Bass (metallic):** Bass clef, 4/4 time. The part features a rhythmic pattern with a metallic sound.

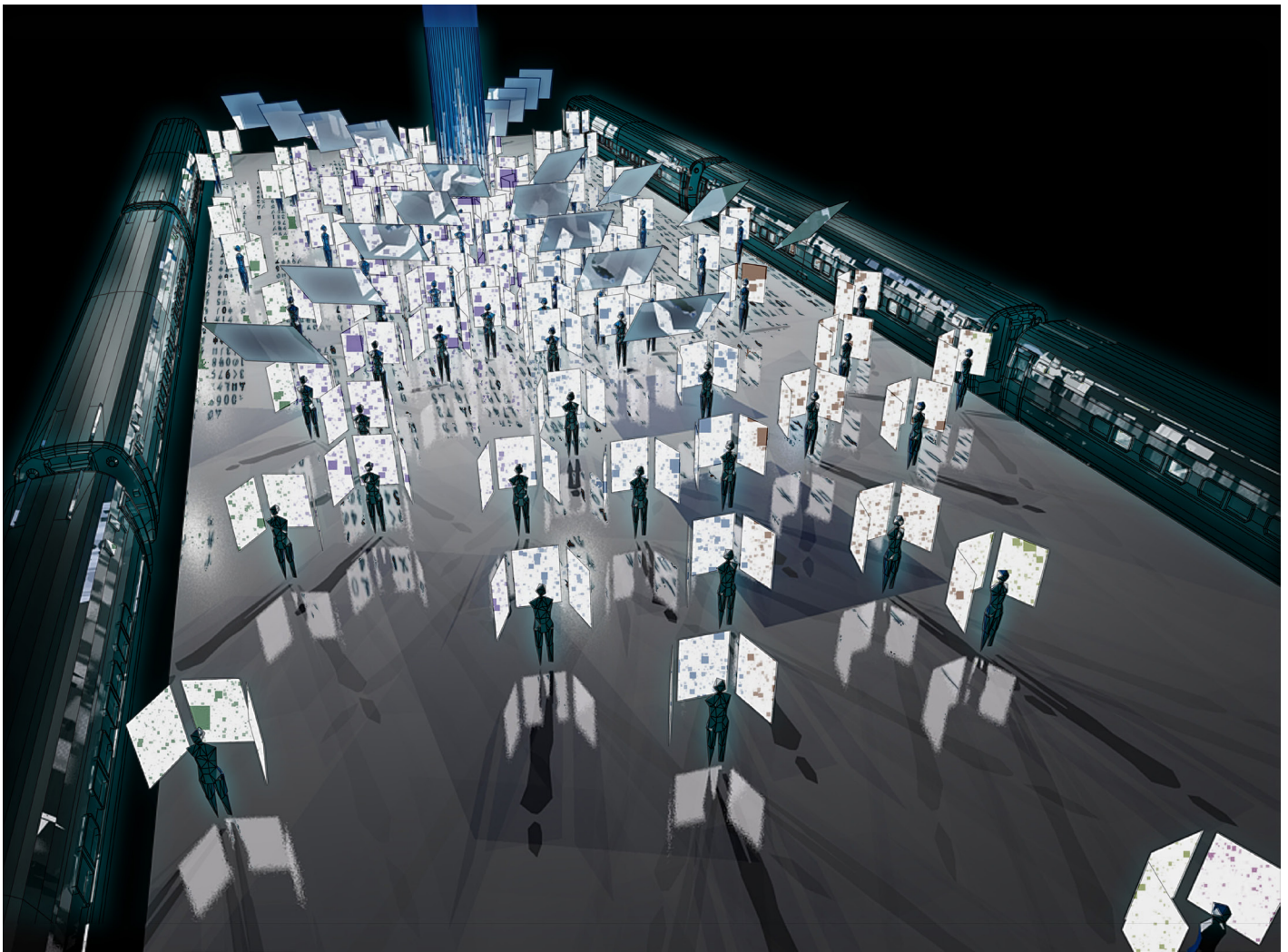
8

the right. He pulled across an image stored on his profile into the drag and drop area on the menu and specified 'Eyebrows'. 'Approach until activation signal' read the screen in front of him. Slowly Korsav leaned forward until a perfectly engineered bleep sounded and a progress bar appeared. A red glow moved around the upper edge of his peripheral vision. A second gentle bleep sounded and the screen switched to mirror function. A second later, before Korsav could check the cut of his eyebrows, there was a distinctly higher pitched ping as his visit to the salon was automatically posted to his profile with a personal thank you message from the salon owner, one of the most popular in District B. Korsav turned back to the mirror. It really was true, what they said about this guy. The lines were absolutely clean and the reproduction of the image he had submitted was reassuringly accurate. Feeling somehow light and energised, Korsav floated back into the stream of images, letting himself be carried homewards by the dazzling graphics of advert sequences.

Korsav noticed the girl from the flower shop walking towards him. Flowers were not grown there, but 3D-printed to order. Their eyes met and their faces instantaneously reacted with the politest of identical smiles. His instant messenger app detected and read her account details and opened a new message field automatically for him to respond socially to her. Korsav pasted a happy symbol and a garden symbol into the message field and pressed send with the same unflinching automation as the device itself. The reply came immediately back to him, eyebrows and a wink. Although one might presume from this response that the girl from the flower shop had noticed Korsav's new eyebrows as they passed, it was entirely possible that she had obtained the information from his profile. Subscribers often read each other's electronic profiles in real time almost as fast as they could recognise each other physically, in the very moment their physical paths coincided. It did not matter to Korsav. This was Nordizk, and such clean social interaction, insured by electronic information against human awkwardness, bred an undeniable sense of oneness between subscribers, as if they were experiencing the same emotion simultaneously. Only a sub-standard citizen would try to destroy what they had here. The natural struggle of the human condition was, for Korsav, the drive to advance and refine the bench marks and sophistication that defined Nordizk and its model of the future citizen. "This is progress" he thought, "without social paranoia, causing offence or forgetting someone, a flawless social etiquette that allowed people to simply be, to live a pure existence, to sail into the future, weightless."

008

The vertical pedestrian circulation of Nordizk perforated the districts like hypodermic needles, compact shoots running off shared pneumatic units, shuttling their human contents through layers of the city. Korsav approached one of the lifts. There was never a queue. To prevent any build



up of passengers, more intense streams of information would be applied strategically to decelerate oncoming people

In District F, where people regarded Nordizk's vertical circulation infrastructure as more of a corrupt rainmaker for confused little grains of rice that bounce around inside it, Ilenia had a small problem. Her supplier had not shown up. It wasn't that the demand for hi-tech scrap was so drastic in itself, but the knowledge that without a safe environment to learn and test new products offline, many young people in District F would simply bite the bullet and follow their curiosity above the meniscus. Once there, they were highly susceptible to subscription and the sleepwalk of an existence that came with it. There was only one practical solution to Ilenia's ethical dilemma. She would head up to the supplier to investigate and take whatever she could get on the way. She kitted up and started clambering through the rough cut steel patchwork substructure of the transport deck.

EXTRACT FROM THE SCORE "CIRCULATE"

00:00 00:00

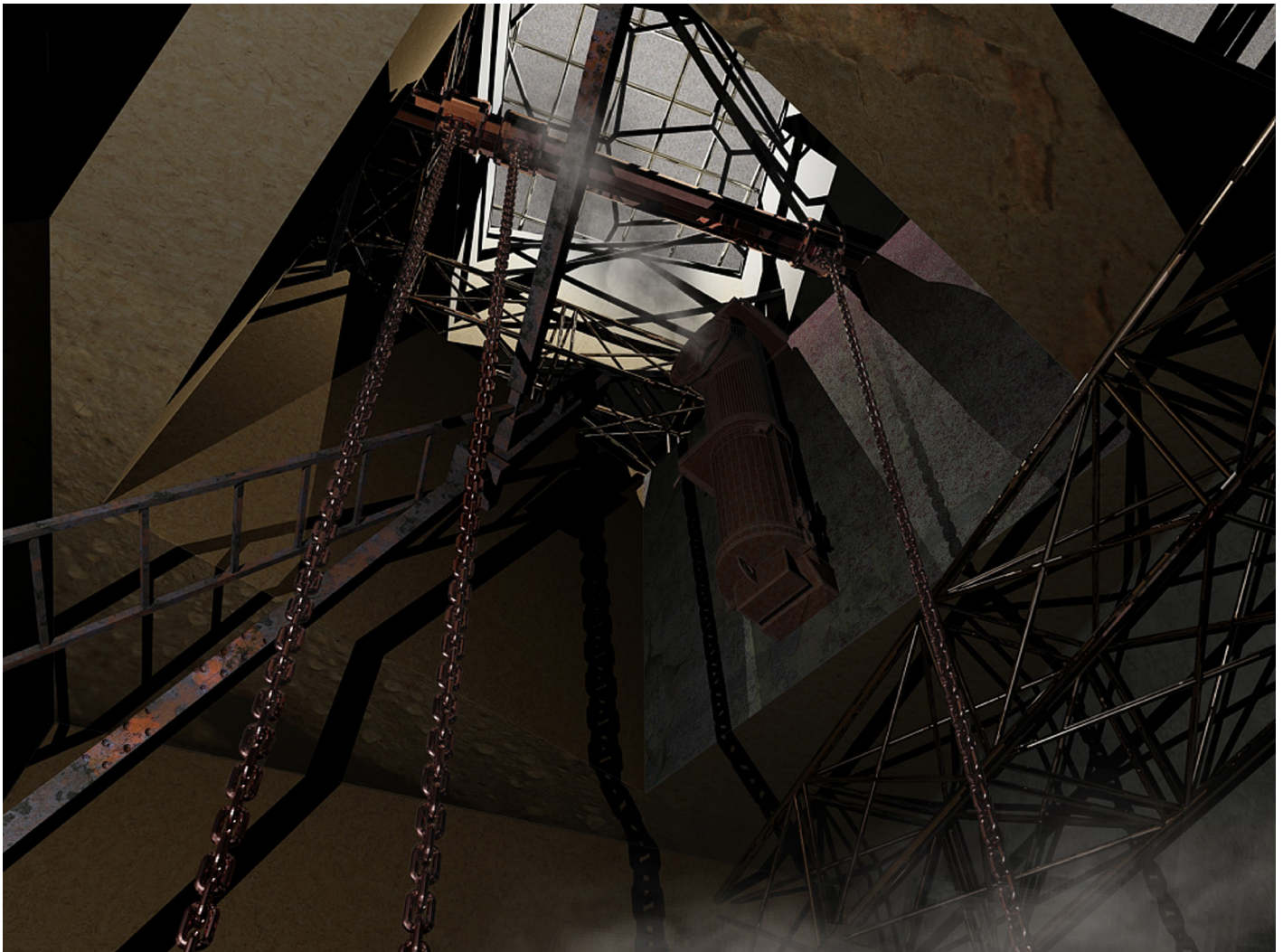
The musical score is for a 4/4 time signature and consists of six staves. The instruments and their parts are as follows:

- Bass Drum (kick):** A rhythmic pattern of quarter notes with eighth-note accents, alternating between the first and third beats of each measure.
- Snare Drum (delay):** A pattern of eighth notes with a delay effect, indicated by a horizontal line below the notes.
- Hi-hat (phazed):** A pattern of eighth notes with a phasing effect, indicated by a horizontal line above the notes.
- Drumset (flanged):** A pattern of eighth notes with a flanging effect, indicated by a horizontal line above the notes.
- Violin (modular):** A melodic line in the treble clef, consisting of eighth notes with a modular effect, indicated by a horizontal line above the notes.
- Double Bass:** A melodic line in the bass clef, consisting of eighth notes with a modular effect, indicated by a horizontal line above the notes.

The score is marked with a page number '8' at the bottom left.

The most commercially dense layer of the city, in terms of trading hardware, pre-programmed objects and data carriers, was the interchange level between the vertical elevators of Districts B-D and the transport deck shearing them horizontally. Shopping and transport had been inextricably linked since before she was born. It forced her to perceive travel as a very negative experience. She needed to enter the interchange at shuttle lift 1032. That was where she might find her dealer.

Korsav was now in the interchange at 5565, a long way away from Ilenia's entry point into the interchange and even further away from her concerns. He browsed his way through a wild flurry of hack insurance, virtual holiday offers and online rehabilitation counselling for those who couldn't let go of their old belongings; people who had some pathetic affinity with printed paper and other such material perversions. Korsav really had to stretch his imagination to its limits to generate any sympathy for such people. He entered the metro carriage without breaking his browsing stream and the train departed, heading from the 5000's westbound down to the 1000's. The stops were frequent and short, but calculated exactly to pick up and deliver all registered users in one mathematically optimised combination, no unnecessary stops, nobody left behind. The stations ticked by with more precision engineered clicks and visual notifications appearing only on the relevant passengers' smart screens. All passengers were seated back to back along a central axis, their personalised segment of the glass carriage



EXTRACT FROM THE SCORE "SCRAMBLE"

Andantino

The score is for the piece "SCRAMBLE" in 4/4 time, marked **Andantino**. It consists of six staves:

- Bass Drum (kick):** Features a sparse pattern of quarter notes and rests.
- Hi-hat (phazed):** Features a rhythmic pattern of eighth notes, some marked with 'x' to indicate phasing.
- Sandpaper Blocks (various):** Features a sparse pattern of quarter notes and rests.
- Drumset (kit):** Features a complex rhythmic pattern with various drum sounds.
- Double Bass (modular):** Features a bass line with a key signature of one sharp (F#) and a tempo marking of 8.
- Voice (sampled noise):** Features a melodic line with a key signature of one sharp (F#).

envelope displaying both journey information and browser windows, whilst affording passengers an unadulterated panorama of the vast expanse of beams, rails, columns and the silver snakes slithering between them under artificial light.

Korsav's train had reached platform 1100 and docked alongside another shuttle, eastbound. Watching the overlapping sets of information on the glass envelopes begin to dance over each other would have been spellbinding to someone who wasn't so deeply enslaved to the content of the information. They appeared at some moment to synchronise then desynchronise as if they were following some kind of sinusoidal waltz. The passengers passed one another, eyes fixed on the sharp rectangular cosmos that swept before their eyes. Korsav was momentarily taken away from the information and entered a trance, the shimmering beauty of the mundane. The piercing scream and the violent slamming on the glass did not register at first.

Only when he saw a greyish cheek dragged back with severe friction exposing a set of teeth, scraping across the back of his display and an eyeball, wild with panic, did he bolt back from the trance. By some instinct he did not know existed, he had already hit the emergency brake. As he felt his mind and body reunite with each other, in what he could only guess was reality, he let out an impulsive cry of horror. The second train had now passed and a mop of thick black hair slid down the glass and out of sight, smearing a patch of oral



EXTRACT FROM THE SCORE "COINCIDENCE"

Andantino

The musical score is for the piece "Coincidence" in the tempo of Andantino, set in 4/4 time. It features the following instruments and parts:

- Drunset (scrap):** Plays a sustained, low-frequency sound across the top of the score.
- Drunset (kit):** Provides a rhythmic accompaniment with various drum patterns, including snare and cymbal sounds.
- Tambourine:** Adds a light, shimmering texture to the percussion.
- Koto (ghostly delay):** Plays a melodic line with a distinct delay effect, creating a spectral quality.
- Flute (flute two):** Plays a melodic line with a key signature of one sharp (F#).
- Flute (flute one):** Remains mostly silent, with a few notes in the first measure.
- Double Bass (machine):** Provides a steady bass line with a mechanical feel, marked with an '8' at the beginning.
- Voice (pylons):** Shows a single note in the first measure, likely representing a vocal or instrumental effect.

condensation and splatter of nasal blood together. Korsav dashed to the exit, frantically banging the 'open' touchpad before it eventually responded and released him, only in time to see the feminine outline of a hobbling citizen desperately retreat into the meniscus.

009

A member of the metro-shuttle maintenance team (MSMT) grabbed Korsav by the shoulders, startling him intentionally. Before he could give chase to the figure in the distance, Korsav was spun ninety degrees to face the officer. Upon being questioned about what exactly he had seen, Korsav replied, 'The girl', and pointed a finger in the direction of the remote figure that had since disappeared. His body lunged to follow but the maintenance worker held him fast and asked him again with a forceful implication, 'Are you sure it was a person you saw? Are you aware that this is the meniscus?'. Korsav turned to show him the blood, but there was none. Instead, a second man, stood by the glass where the blood had been, was inspecting the service box above Korsav's seat, cables spilling out and dangling in front of the glass. 'I see' replied Korsav, a feeling of fear mixed with guilt and confusion washing over him. 'An error has been logged and the problem will be repaired. Please enjoy the rest of your journey,' said the maintenance man as he guided Korsav back onto the train and his colleague clipped the service box cover back into place. The train set itself into standard motion once again.

Korsav's info-display pinged a new message alert:

"Nordizk's Transport Corporation apologises for the recent graphic glitch in your visual environment. We are investigating the following causes:

- Hacker interference
- Breach of advertising regulations
- Cross-channel interference

We thank you for your co-operation in continuing to help Nordizk remain the most technologically advanced city on the planet."

Korsav resumed normal browsing behaviour, flitting and scrolling, downloading and discarding, but he seemed to be moving through the influx of media faster than normal, without absorbing and processing things at the same rate. He felt as if he was going through the motions in order to entertain some alien thought. Could he really have leapt those two metres to the emergency brake because of a horror style hacking prank or a crossed movie clip from another channel? It was entirely feasible and probably correct. Now he began to grow anxious, not because he was overwhelmed with doubt, but simply because of the slightest presence of doubt in the first place. Did he mean 'correct' in the sense of civic responsibility sense or did he mean 'true' in the sense of believing his own eyes. He had for the first time become aware that there was a difference. He had always believed that

Nordizk stood for true progress, but progress seemed to now come at a higher price than ever before, that he must sacrifice his own internal curiosity.

Desperately trying to turn his attention back to a reality of which he was no longer convinced, he could not help but scour the news blogs for stories related to such malfunctions, wondering if they might be currently trending, hoping in any case that they existed and that what was correct was also true.

010

Although Ilenia's eyes were undamaged by the accident, she couldn't make out exactly where she was due to the blinding agony down her side. She knew the risks of what she did for a living and had to regularly weigh them up against the physical security and comfortable life she denied by remaining in the offline zone below the meniscus. She remembered when her plight was only an academic one. She remembered when she was simply a member of an intellectual community, ideologically opposed to the political stance of the Nordizk authorities. Now, at the end of every day she made it through, she was reminded of how this intellectual struggle had transformed itself into slums, malnutrition, poverty, violence, taking physical risks on a daily basis and she found it ever more difficult to justify. Although it engulfed her and burnt through her concentration, the intense pain that shot through her body did not hurt as much as when it slowly ebbed away and she was left alone with the same inevitable question once again - 'why?'

Managing a narrow squint, she could make out bright light and in her semi-consciousness fell victim to the optimism that she might be in some safe medical hands. As her mind quickly recalibrated, the tedious and bitter reality stung her. Three metres down in a hole between two giant beams, she lay flat out under the taunting white brilliance of the transport deck lights. It was too dangerous to shout in case a patrol was nearby. Without hesitation or self pity, she embarked on an arduous and ugly routine of half metre worm-like writhing, then a pause to recoil her body to what limited extent she could, followed by another half metre spasm, until she could drop into a conduit and hope that the first person she saw would not be the one to put the boot in.

A tall bearded man with overcoat collars turned high over his jawline traced a mouse-like path along the edge of the circulation conduit. Kneeling down swiftly he whispered a simple instruction to the girl, 'Stay alive. There has been a development. It will be of interest to you Ilenia.' She recognised the voice. They had studied technological anthropology together at university in the days when Nordizk was still affiliated with a respected mainland academic institution. He ripped off the nearest cladding panel that was barely still attached and carefully manoeuvred Ilenia onto it. He tied the waist belt of his coat to the bent metal fixings and began to drag the improvised sledge to safety. Ilenia lay flat, intermittently grimacing with the jolts caused by the uneven metal floor mesh, and basking in glorious relief at her rescue inbetween.

EXTRACT FROM THE SCORE "RESCUE"

Andantino

The score is for the piece "RESCUE" in the tempo of Andantino. It features a percussion section and a string section. The percussion includes Timbales (long reverb), Drumset (rhythm), Drumset (accent), and Bass Drum (kick). The string section includes Violin (lead 1), Violin (lead 2), Violoncello (pad 1), Violoncello (pad 2), and Double Bass (bass pad). The key signature is three sharps (F#, C#, G#) and the time signature is 4/4. The score begins at measure 8. The timbales, drumset (rhythm), drumset (accent), and bass drum parts consist of a single hit at the start of the measure. The violin (lead 1) part has a single note. The violin (lead 2) part has a complex rhythmic pattern. The violoncello (pad 1) part has a sustained note. The violoncello (pad 2) part has a complex rhythmic pattern. The double bass (bass pad) part has a single note.

Timbales (long reverb)

Drumset (rhythm)

Drumset (accent)

Bass Drum (kick)

Violin (lead 1)

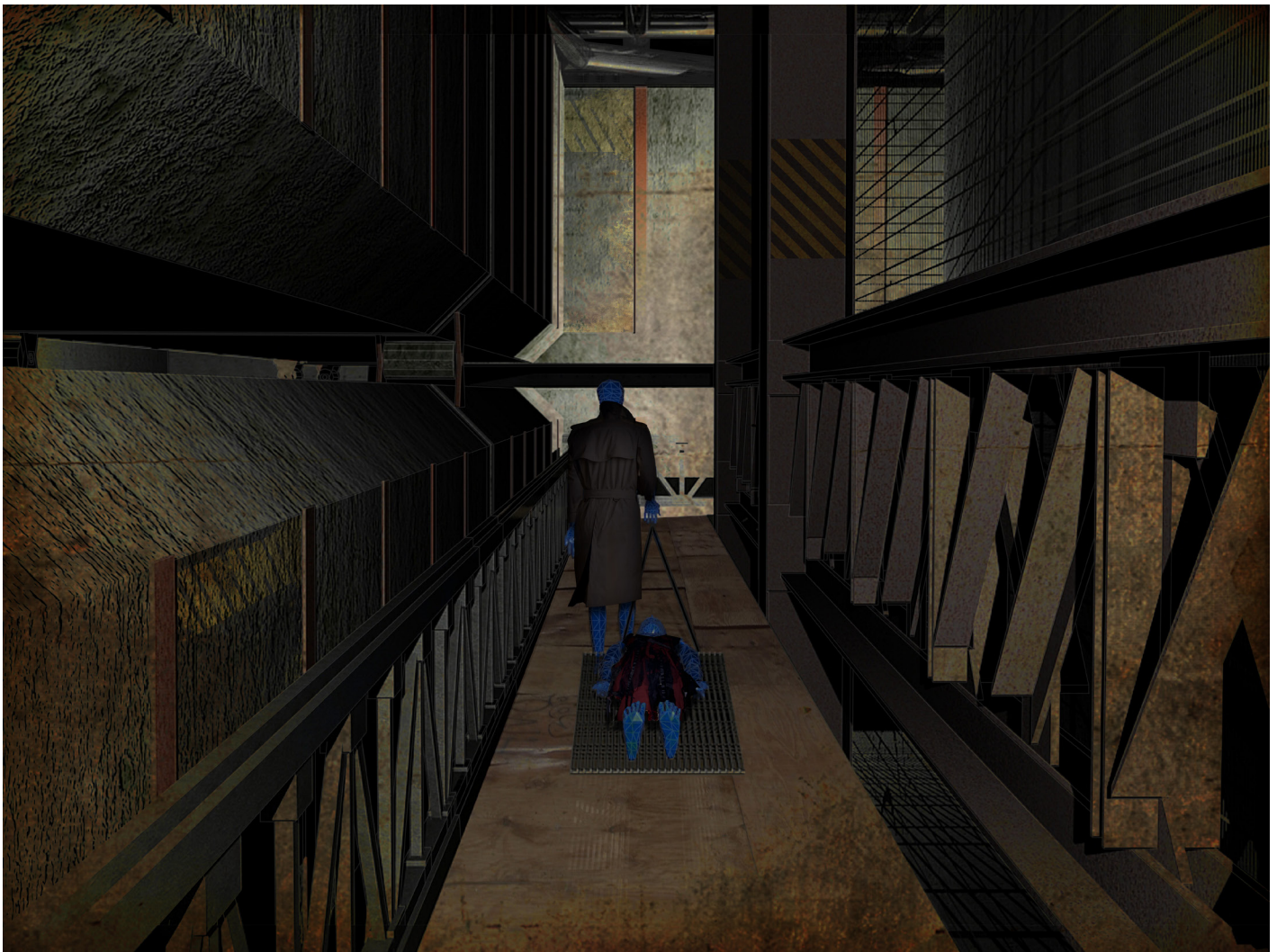
Violin (lead 2)

Violoncello (pad 1)

Violoncello (pad 2)

Double Bass (bass pad)

8



Ø11

Korsav spent weeks trying to iron out his lapse. He knew he was letting down society by harbouring scepticism about what he thought he had seen. He fought for a long time to eradicate the uncertainties before one day he decided to allow himself a lapse of civic correctness, in the hope that the illusion of truth that haunted him would reveal itself through reason to be both false and incorrect. He lay in bed, closed his eyes and let the flood of doubt pour into his mind. What if the girl was real? He stopped himself, knowing that he was inhibited by fear, and then gathered the mental strength to run at it again. The girl was real.

Korsav teetered on the cusp of breakdown. Why did the girl run away from help? Why did she retreat into the meniscus? Not only had his environment suddenly become an unknown to him, but his perception of Nordizk was now blown apart. That someone would walk away from medical attention, modern amenities and social harmony in a crime free community disturbed him. He could not see the sense in it. There was no poverty or malnutrition in Nordizk. That was clear from the profiles he saw everyday in the street and the various networks he was subscribed to, boasting foodies, tech fanatics, music aficionados, fashionistas and every type of cultural consumer online.

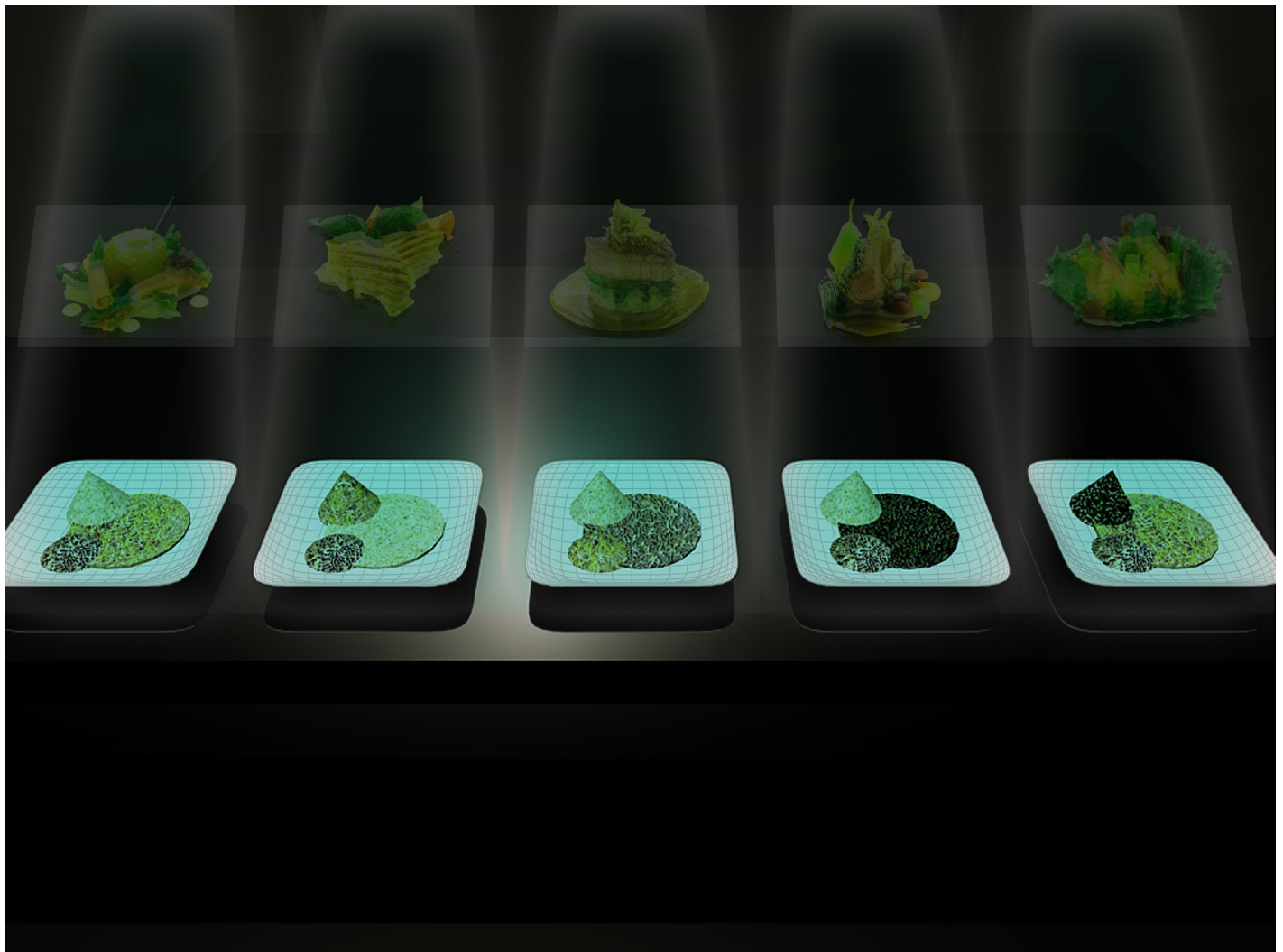
EXTRACT FROM THE SCORE "DOUBT"

Andantino

The score is for the piece "Andantino" and consists of six staves. The top staff is for Drumset (reverb), showing a triplet of notes. The second staff is for Bass Drum (pulse), featuring a rhythmic pattern of eighth notes. The third and fourth staves are for Violin (lead 1) and Violin (lead 2) respectively, both in treble clef with a key signature of three sharps (F#, C#, G#). The fifth staff is for Violoncello (pad 1) in bass clef, and the sixth staff is also for Violoncello (pad 1) in bass clef, showing sustained notes. The tempo is marked "Andantino".

Everyone was online, he thought. Like a boat being tethered to shore, Korsav's naivety still got the better of him, despite his courageous leap into the deep waters of self-interrogation.

Nevertheless, he began to open his plane of thought and analyse his own life with a scrutiny that he had never before been compelled to wield. He shopped for breakfast and was about to select an 'afro-med classic' of yellow and olive pieces, when he decided to switch to 'euro-med lite' at the last minute. The 'euro-med lite' consisted of toast sticks and olive pieces, although the toast sticks of the 'euro-med lite' looked incredibly like the yellow pieces of the 'afro-med classic' and when the food appeared in the replicator its colour was never the same as the image that appeared on his profile. The plate sat on the counter. He stared at the material and looked back at the image. He had never wondered before what he was eating because what was physically on the plate didn't affect his profile. Food had always been just another channel of self-expression. The most important thing about it was that it was always his choice, his personal choice that was communicated electronically to the rest of society. That choice, that representation of Korsav had always been transported by the image not the plate. The plate and the substance that arrived on it had never played an important role. It was simply a vessel for this message, a carrier of his identity and the taste and texture had never performed any significant function.



Contemplating the dish now, in light of his preconception that nobody in Nordizk was malnourished and that everybody ate well, he could not be sure whether he knew exactly what eating 'well' really was. The replicator always produced something of similar colour and consistency, with slight variations that in some vague way could be linked to a digital image. The images, on the other hand, were diverse and exotic with descriptions that implied culinary ethnicity.

Korsav thought horror was a somewhat unjustified reaction to this dietary revelation and paced the living space slowly, looking for the next victim of his now raging curiosity. He looked at the bed, then thought about the food and shuddered rigidly as bands of disgust tightened around him like a straight jacket. What activity had really taken place there on the thing known as bed, draped in its textile lies? The smart surfaces which had coaxed arousal from both parties of intercourse with electronic distortions of carnal fantasy as they banged their parts together now seemed a very hollow theatre of non-sex. Encounters began to flash back through Korsav's memory, eyes that never met, flesh that was caressed on visual cues beamed separately into the two distant perpendicular gazes of the participants, followed by the state given instruction where to ejaculate, encounters that occurred through profile matching, professional pairing and other automated services. As Korsav dived deeper into his epiphany, he discovered that although his mortality was always so clear to him, the physicality from which it stemmed had thus far eluded him.

012

Ilenia had made good recovery, though her neck was still braced and her left arm in a sling. Walking was painful but necessary. She arrived at the meeting early to take a seat at the front. She swivelled her body awkwardly around on the chair to see who was present in the growing crowd, recognising old friends and lost souls, observing the solemnity of those ready to fight for their beliefs. She waited patiently, knowing what was to be announced, but not how it would be received. A riot would not be helpful. Abstaining from action would be inhumane. As the extent of the violation of human rights in the districts above became apparent, the rotting underworld of District F could give its residents safe refuge as long as they posed no threat to the government.

The chairman coughed gently into the microphone and the crowd silenced itself.

"Brothers and sisters; comrades,
It is in the utmost gravity that we congregate here today. Above us, right now, this very moment, a heinous crime is being committed against humanity in the name of greed, money lust and power. We have gathered new intelligence

from multiple trusted sources, that the subscribing online majority are in fact no longer connected to the internet. During the last twenty years, the censorship of Nordizk's online living programme has ultimately evolved into an entirely closed intranet state. It has been engineered solely for the purpose of trading the lives of millions under the banner of universal consumption, a false ideal propagated by free onliners, our ruling so-called elite.

We have for a long time respected the freedom and will of those among us who choose to subscribe, but we have forgotten what forces, beyond Nordizk and its five million inhabitants, are acting on our beloved city. Today we finally received enough information to be able to confirm that forty subscribers have been killed in order for Nordizk to meet the financial targets of the free onliners.

It has come to our attention that the outside world is suffering from a catastrophic economic crisis and the market that produced such ravenous demand for bulk consumer farms like Nordizk is now collapsing. The forty that have died so far were defective consumers. No longer valuable as a tradable resource and with no alternative way of life, they were forced into simulated poverty, their fictitious jobs taken away from them and their diet reprogrammed to facilitate their extermination.

These people were not defective human beings and given a way out of subscription they could have had a future. As the economy deteriorates, we suspect that more of the weaker consumers will be threatened under the false pretence that they as individuals cannot sustain themselves. The truth is that none of the subscribers can sustain themselves. They survive on state rations, presented to them as their own free choice.

Brothers and sisters; comrades,

It is time for us to wake our fellow citizens from their sleep-walking before they are slaughtered in unspeakable numbers. We are on the brink of civil war and we must ascertain a solid grasp of what this really means and how we can best engage our enemy, the free onliners.

The Council of the Liberation will present, in forty-eight hours time, its strategy to break the shackles of censorship and the totalitarian choke hold that the free onliners have on the minds and lives of the subscribers. We must break universal consumption in the name of humanity - “

He was interrupted by a loud thud as five patrolmen stormed into the meeting. The chairman carried on without alarm, as if picking up the exact same thread that had been momentarily broken, “ - and so, all those in favour of the new timetable for waste collection starting in two weeks time, please raise your hand.” Roughly three quarters of the floor raised their hands, as if they had rehearsed the scene countless times. “Ok, then that's settled. The next item is the waste containers...” the chairman continued to go through various motions regarding District F'S waste collection. The patrol stood aimlessly, bewildered and blood-thirsty around the entrance, waiting for an opportunity to pounce that never came. The chairman talked and talked and talked. Ilenia began to nod off and let her chin rest on the front edge of the neck brace as her eyelids performed a delicate flutter of not-quite-closedness.

She weighed things up in her own head again, the usual pros and cons, the usual conclusions, but she now found herself moved in a way that she had not been before, by a very simple action who's meaning seemed to grow on her every hour. It was he subscriber who hit the emergency brake. It

EXTRACT FROM THE SCORE "CONFERENCE"

Andantino

The musical score is for the piece "Andantino" and consists of nine staves. The key signature is B-flat major (two flats) and the time signature is 4/4. The tempo is marked "Andantino".

- Tubular Bells (step synth 1):** Treble clef, B-flat major key signature. The melody features a series of notes with a long, sweeping slur across the first four measures, followed by a final note in the fifth measure.
- Tubular Bells (step synth 2):** Treble clef, B-flat major key signature. The melody consists of a sequence of eighth and quarter notes, with a final note in the fifth measure.
- Horn (power brass):** Treble clef, B-flat major key signature. The staff contains a single whole note in the first measure, which is a whole rest.
- Flute (tension):** Treble clef, B-flat major key signature. The melody features a series of notes with a long, sweeping slur across the first four measures, followed by a final note in the fifth measure.
- Drumset (accent):** Percussion clef, 4/4 time signature. The rhythm consists of a series of eighth notes with accents, followed by a quarter note in the fifth measure.
- Bass Drum (kick):** Percussion clef, 4/4 time signature. The rhythm consists of a series of eighth notes with accents, followed by a quarter note in the fifth measure.
- Snare Drum (machine):** Percussion clef, 4/4 time signature. The rhythm consists of a series of eighth notes with accents, followed by a quarter note in the fifth measure.
- Voice (unpitched chanting):** Bass clef, B-flat major key signature. The melody consists of a series of notes with a long, sweeping slur across the first four measures, followed by a final note in the fifth measure.
- Voice (unpitched shouting):** Treble clef, B-flat major key signature. The staff contains a single whole note in the first measure, which is a whole rest.



was the way that his panic had unravelled all the conditioning and virtual anaesthetic that universal consumption had forced upon him. It stimulated a new sense within her. What she had previously thought a matter of sympathy, responsibility and principal, she now felt as something else - empathy, compassion, something in common between them.

Eventually the patrol grew bored and restless and left. They were no wiser than the subscribers when it came to the true horror of Nordizk. Like all police or soldiers, they were necessarily without reason or independent thought in order to preserve their function of carrying out orders, rendering them morally dehydrated. There was at least safety in numbers for the inhabitants of District F this time.

Ilenia and a group of old friends laughed about it later that night, cramped together in one of their tiny living pods, perched on old books and magazines arranged in stacks of random heights, drinking diluted moonshine. About to face the ultimate translation of theory into practice, years of standing by their intellectual ideals and protecting their moral integrity through online abstinence was now condensed into one active, violent risk. "So this is it, all or nothing", someone muttered, casually, half-raising a glass. They reflected on what had been said at the meeting and speculated on possible courses of action. There were no weapons as such and, although explosives could be very efficiently improvised, there was a general consensus that storming District A by force was not really an option due to the collateral damage that

employing such an improvised arsenal would cause. They ruled out taking hostages, seeing as the whole subscriber population could be converted into hostages by the free onliners, thus endangering rather than protecting them. Hacking was discounted because after years offline, surviving on outdated software, the computer literacy of District F's youth could not be relied upon to override Nordizk's digital security force.

What they all suspected was that the best possible chance they would have to liberate the subscribers would be to re-open online communication with the rest of the world, exposing their own culture to the risk of meeting the same fate as the subscribers. This solution was dependent on multiple assumptions.

- That the crimes against the subscribers were unknown to the outside world and those who traded with Nordizk.
- That the internet itself still existed, and did so, at least partially, in its original, free capacity.
- That, having learned of the situation, some outside organisation would be prepared to take action.

Ilenia thought about the fierce urgency of the situation and the mention of civil war at the meeting. Then she returned to conversation about the plan, which sounded like a grand inflation of a simple S.O.S. Was that really the resistance? Was that really the culmination of all their courage and



EXTRACT FROM THE SCORE "ILENZIA'S CIRCLE"

Andantino

The musical score is for the piece "Ilenia's Circle" in the tempo of Andantino. It consists of eight staves, each representing a different instrument or sound effect. The key signature is two sharps (F# and C#), and the time signature is 4/4. The Sitar part (accent) starts with a whole note chord. The Tenor Saxophone (mute) and Bass Clarinet (synth) play a melodic line with eighth notes and slurs. The Marimba (delay) plays a rhythmic pattern of eighth notes. The Organ (pad) plays a sustained chord. The Double Bass (close up) plays a bass line with eighth notes and slurs. The Drumset (acoustic) plays a rhythmic pattern with eighth notes and slurs. The Voice (paper rustling) plays a single note.

Sitar (accent)

Tenor Saxophone (mute)

Bass Clarinet (synth)

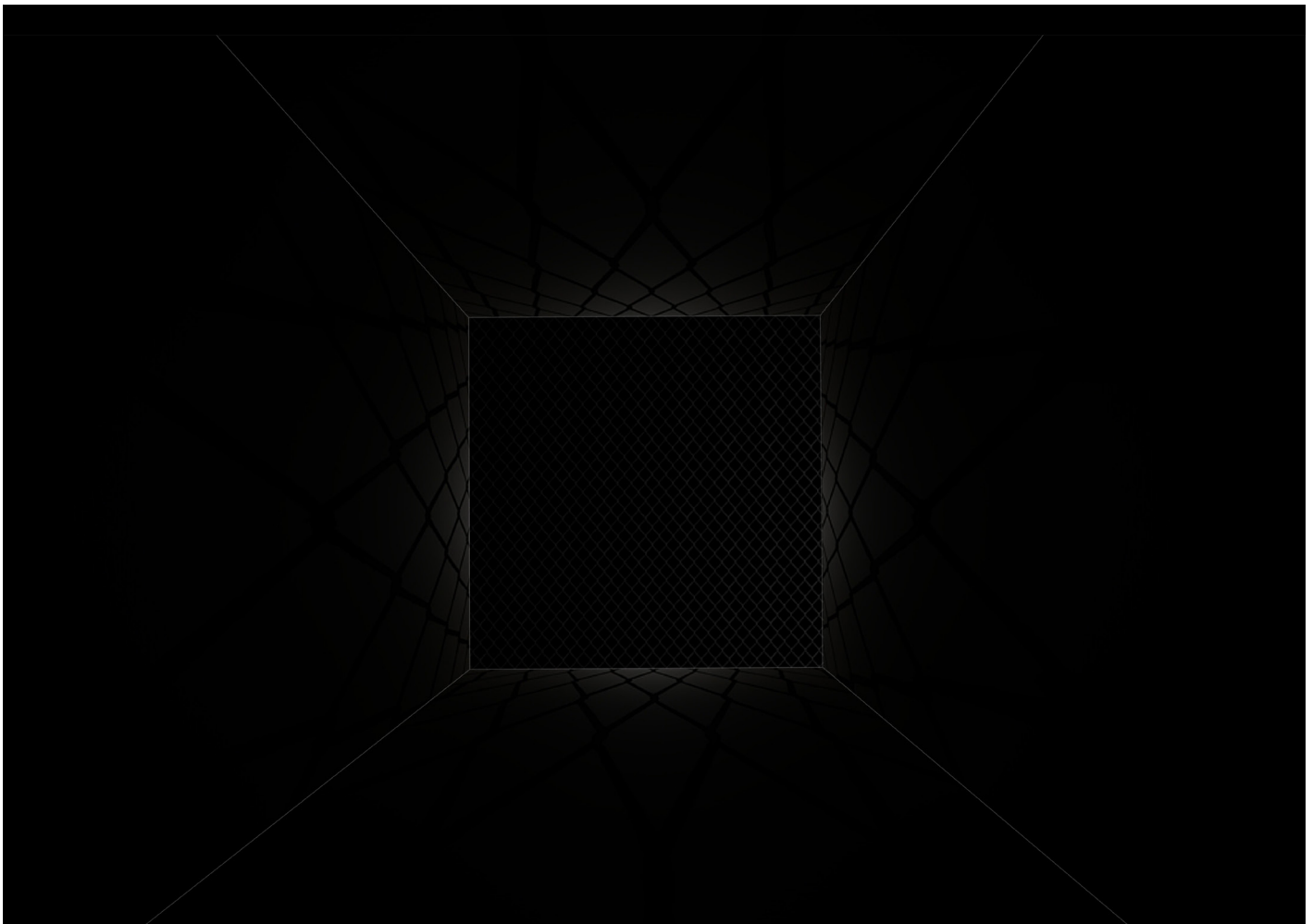
Marimba (delay)

Organ (pad)

Double Bass (close up)

Drumset (acoustic)

Voice (paper rustling)



intelligence, a blind plea of hope? The boy appeared again in her head, his impulse action an absolute and undeniable human instinct like a single small inextinguishable flame, burning silently within, only needing the tinder to light up and set the prison of his mind ablaze. She needed to know if it was possible, but she knew there was a chance that nobody wanted rescuing at all.

Ø13

Korsav rode the metro for long periods of time every evening, spending as much time as he could loitering on platforms without arousing suspicion. He scanned the horizontal expanse, keeping in reserve the strength to handle his own insanity, ready to see a seagull, a rat or any other creature slam clumsily into a train and make sense of it all, but hoping with the rest of him to see a human form walking the treacherous landscape.

The day of the meeting was the day he saw the bearded man, overcoat collar turned up high against his face as if it performed no climatic function, but acted as a force-field to all other things, material or metaphysical. He had been sent by Ilenia to collect a data census of males 25-35 years old from a crooked patrolman. He was not aware, as Korsav began sprinting towards him, that the task Ilenia had in mind was about to get a lot easier and a furious chase followed. Neither men could run very well. Neither displayed

EXTRACT FROM THE SCORE "DESCENT"

Andantino

The musical score is written in 4/4 time and consists of three staves. The top staff, labeled 'Celesta (lead)', features a melodic line with eighth notes and rests, including a sharp sign (#) on the second measure. The middle staff, labeled 'Violoncello (pad)', shows a sustained note with a flat sign (b) and a long horizontal line indicating a sustained pad effect. The bottom staff, labeled 'Drumset (machine)', contains a complex rhythmic pattern with various drum sounds represented by different note heads and stems.

any amount of agility or pace. Physical exercise on Nordizk was undertaken in cramped spaces with the aid of machines and as the two men staggered about like newborn lambs, it seemed more a question of who would trip first than anything else. It was Korsav. As he fell through the gap he inhaled and braced himself for an epic plunge into the icy water only to face a series of consecutive impacts with various hard surfaces jutting into the void at wild angles. Upon the last he lost consciousness.

He woke to distinctly alien surroundings of decay and a noise that was so foreign that he was unable to make out if it was loud or soft. It was different to all sound he had heard before, a continuous mechanical buzzing, no thin swooshes, no rounded pings, no smooth canned applause, no gentle clicks or synthesised fanfares, just a constant drone, soothing yet raw. The walls looked so dilapidated and frail that the only reason that Korsav could think of for their remaining intact at all was that they were cared for. A hand held a glass to his mouth and at first he flinched before the reassurance of another hand, placed surely and calmly on his shoulder, somehow


signalled to him through its steady looseness that it was ok to take a sip. In his mouth he tasted nothing, then a burning glow began to spread from the top of his stomach throughout his entire body. As he exhaled it sailed away on his breath, only to curl back on itself as an aroma enveloping him from the outside. "Good stuff, isn't it?" asked a male voice. "Yes" Korsav replied, looking up to see the bearded man standing over him, smiling at him.

Korsav, slumped on a chair, could feel his face swollen and throbbing. He scanned the room. A cracked mirror returned the image of two heavily bruised eyes and a taped up nose to him. The walls returned nothing more than their age, but, interrupting their blankness, something familiar leapt out at him, the thick mop of black hair, this time attached to a face in its undistorted natural state of quiet concentration.

"What is happening?" asked Korsav.

"We would like you to help us answer that question", replied Ilenzia, "and we do not have a lot of time to waste."

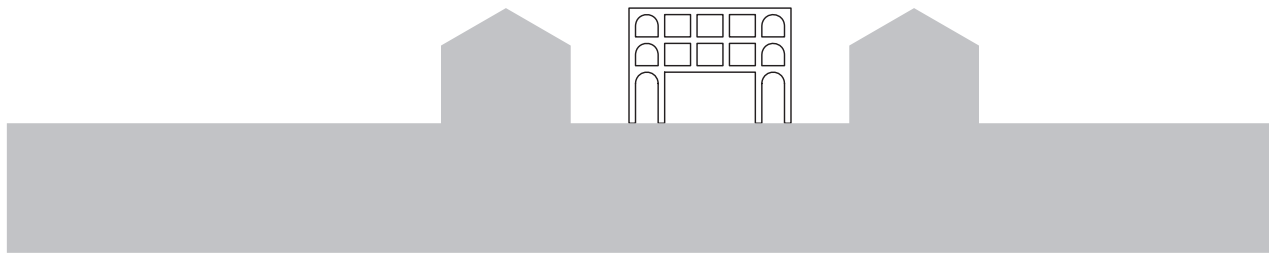




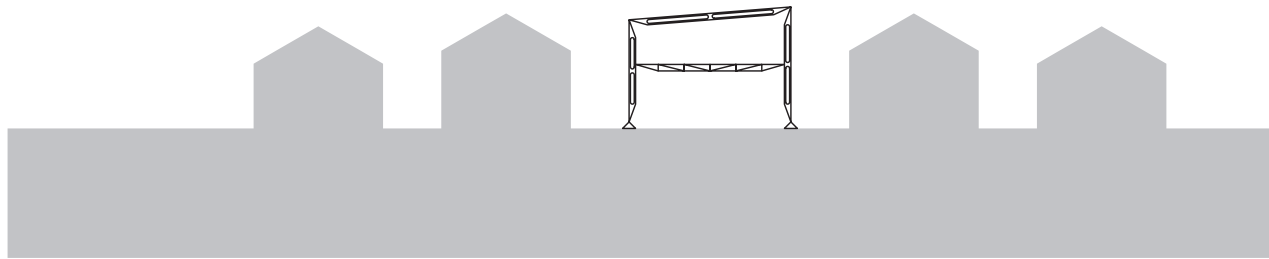
7. WHAT IS THE ARCHITECTURAL DESIGN?

BUILDING CONCEPT

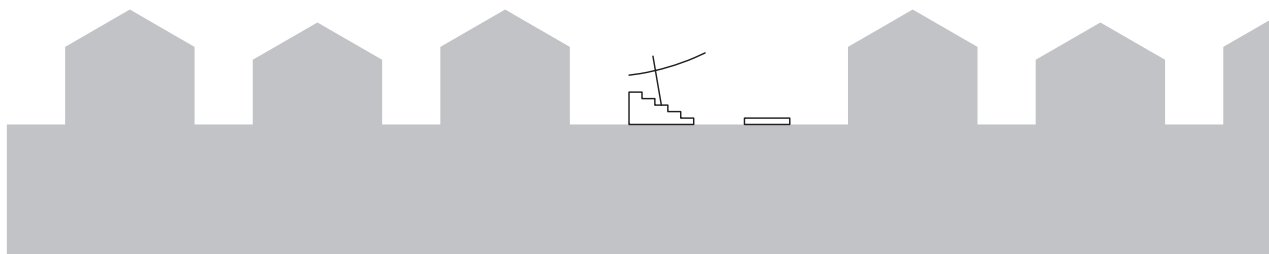
Traditional Opera House Concept // Traditional Building Technology // Transitional City ca. late 18thC



Traditional Opera House Concept // Modern Building Technology // Post-Indust. City ca. late 20thC



Modern Festival Concept // Stage Technology // Post-Indust. City ca. early 21stC



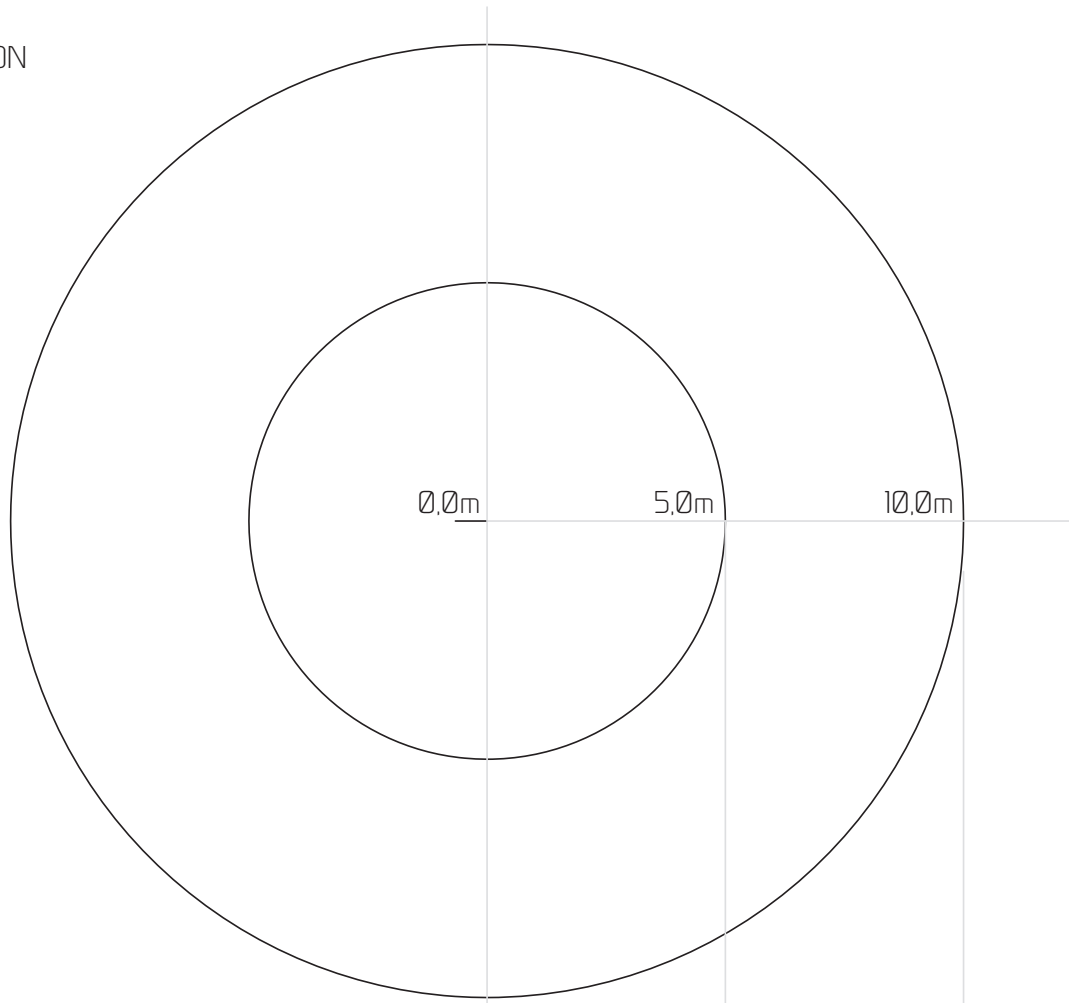
Modern Festival Concept // Information Communication Technology // Megacity



↓ Dissolving Icon into Pure Performance

PRINCIPLE OF GEOSOUND APPLICATION

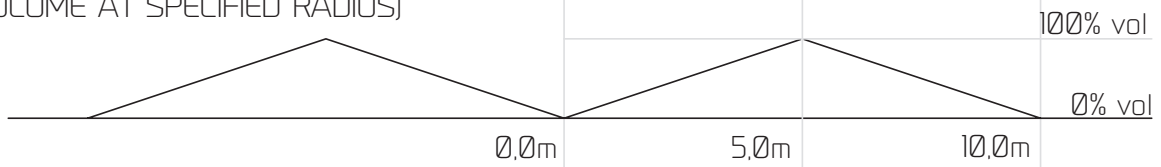
POINT LOCATION



PRIMARY SOUND ASSIGNED TO POINT LOCATION
(PEAK VOLUME AT ORIGIN)



SECONDARY SOUND ASSIGNED TO TRANSITION
(PEAK VOLUME AT SPECIFIED RADIUS)

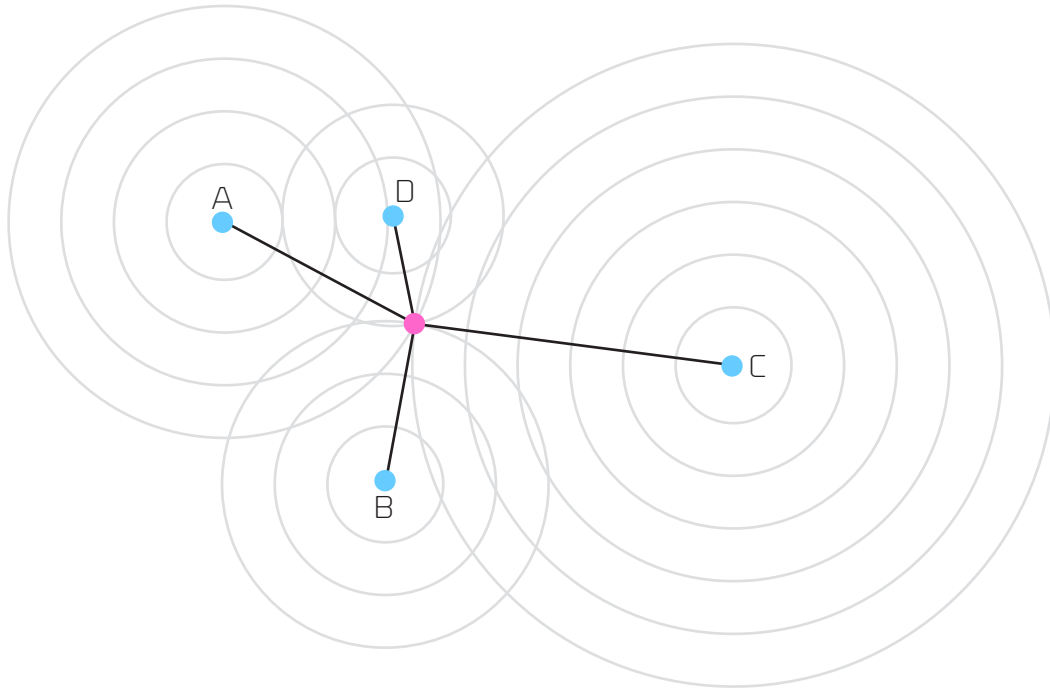


MIXING SOUND BY GEOLOCATION

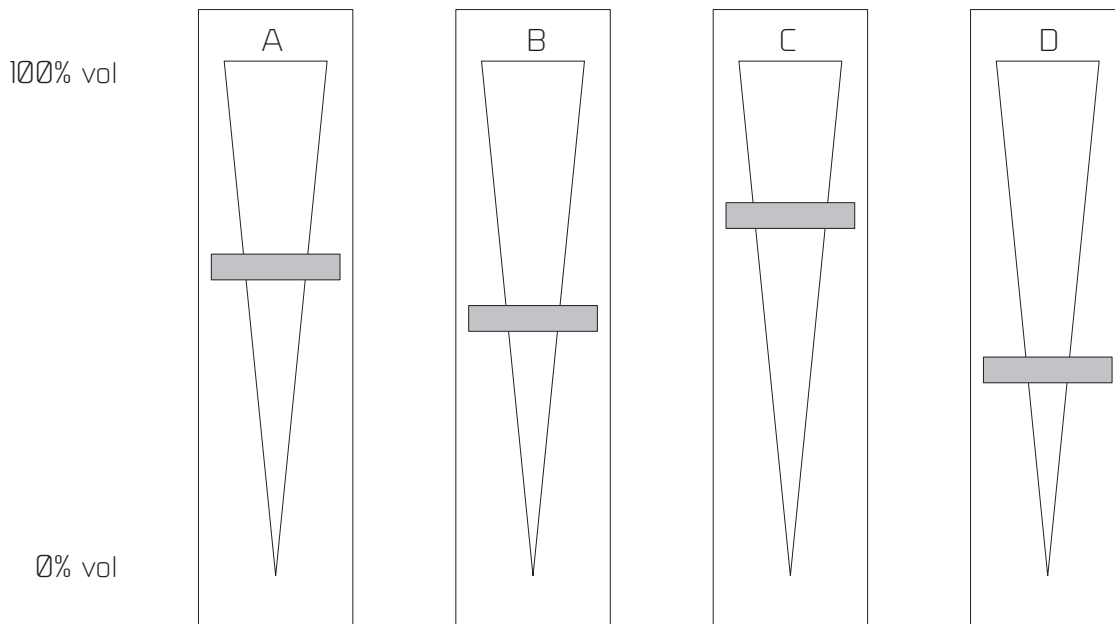
EXAMPLE SCENARIO

USER LOCATION: ●

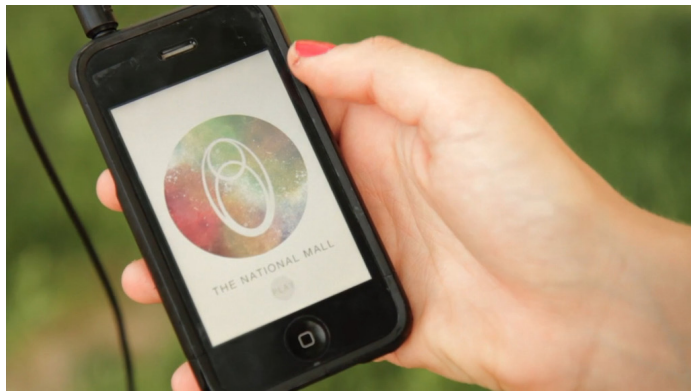
SOUND LOCATION: ●



CORRESPONDING VOLUME LEVELS



BLUEBRAIN



Location specific music is the basis for the Future Operatic. Its existence in the marketplace indicates that a new range of possibilities are ready to be exploited in the name of architecture and urbanism. The location specific album for central park was a major design precedent for this project, yet whilst it is groundbreaking on some levels, on others the project amounts to little more than an artistic by-product of the zeitgeist rather than a serious investigation into the cultural potential of this technology.

It is one thing to embrace technology through the creative process, but as architects it is our duty to bring order to our environment, organising our experience of space in the most humane way possible. The Future Operatic seeks to move closer to establishing a relevant philosophy and a set of principles that could be used to perform this task beyond analogue space.

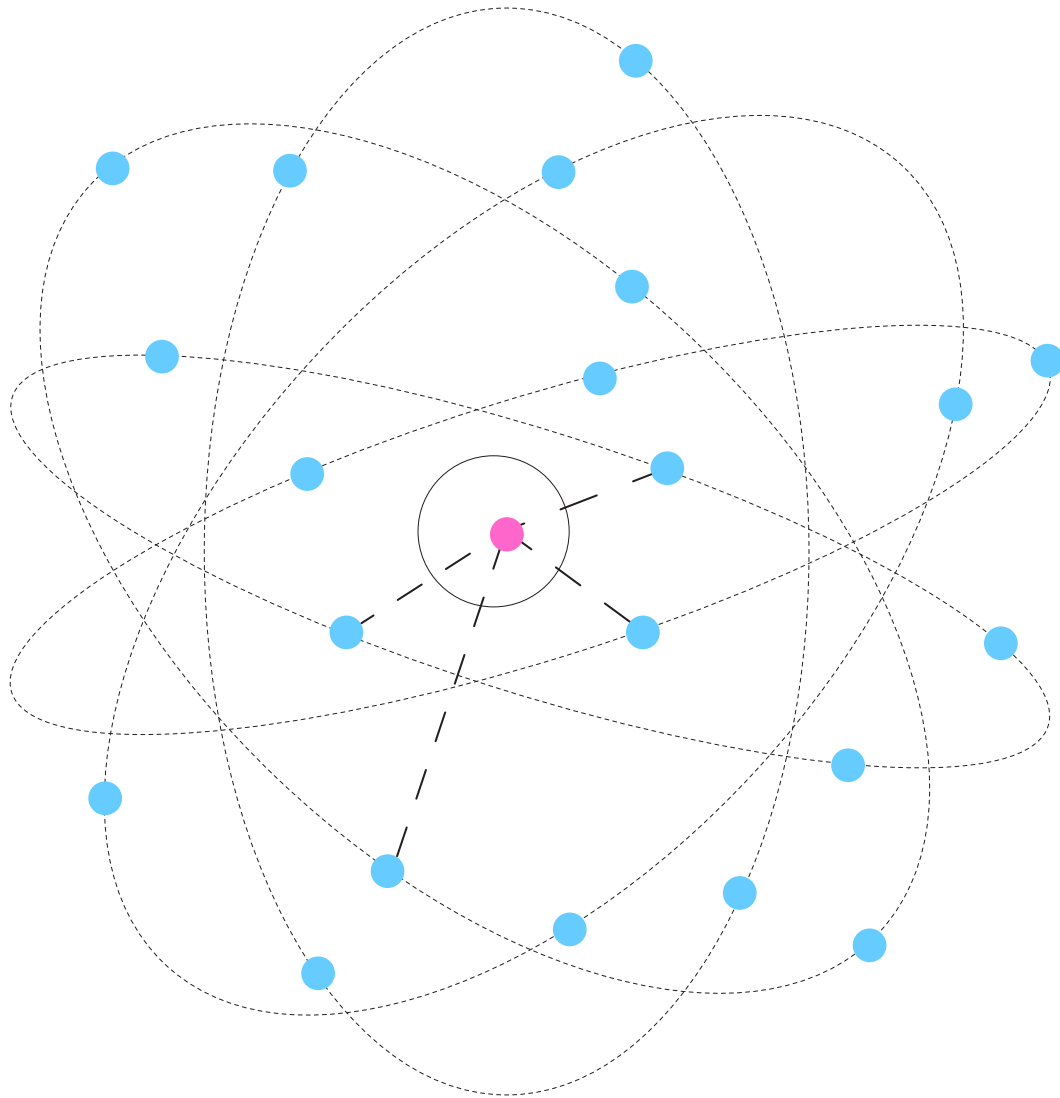
"Location-based music is the somewhat clumsy term we've used to describe a type of composition that uses GPS to sonically map a landscape. We have released 3 albums, each for a different location (The National Mall in Washington DC, Central Park in New York and Austin, Texas for SXSW Interactive), released exclusively as mobile apps. These aren't albums you can download or purchase on a CD. That's because the music and the landscape are intrinsically linked and they only work within the confines of the designated space. Musical nodes and pockets are geotagged throughout a park so that as the listener traverses the physical space, a musical score is unfolding around him or her. Think of it as a chose-your-own-adventure of an album."¹

Ryan Holladay



upper left ², lower right ³

GLOBAL POSITIONING SYSTEM



Satellite sends signal of its location and the time that the signal was sent (t_1).

Signal travels at speed of light (c).

Device receives signal from the satellite and records the time that the signal was received (t_2).

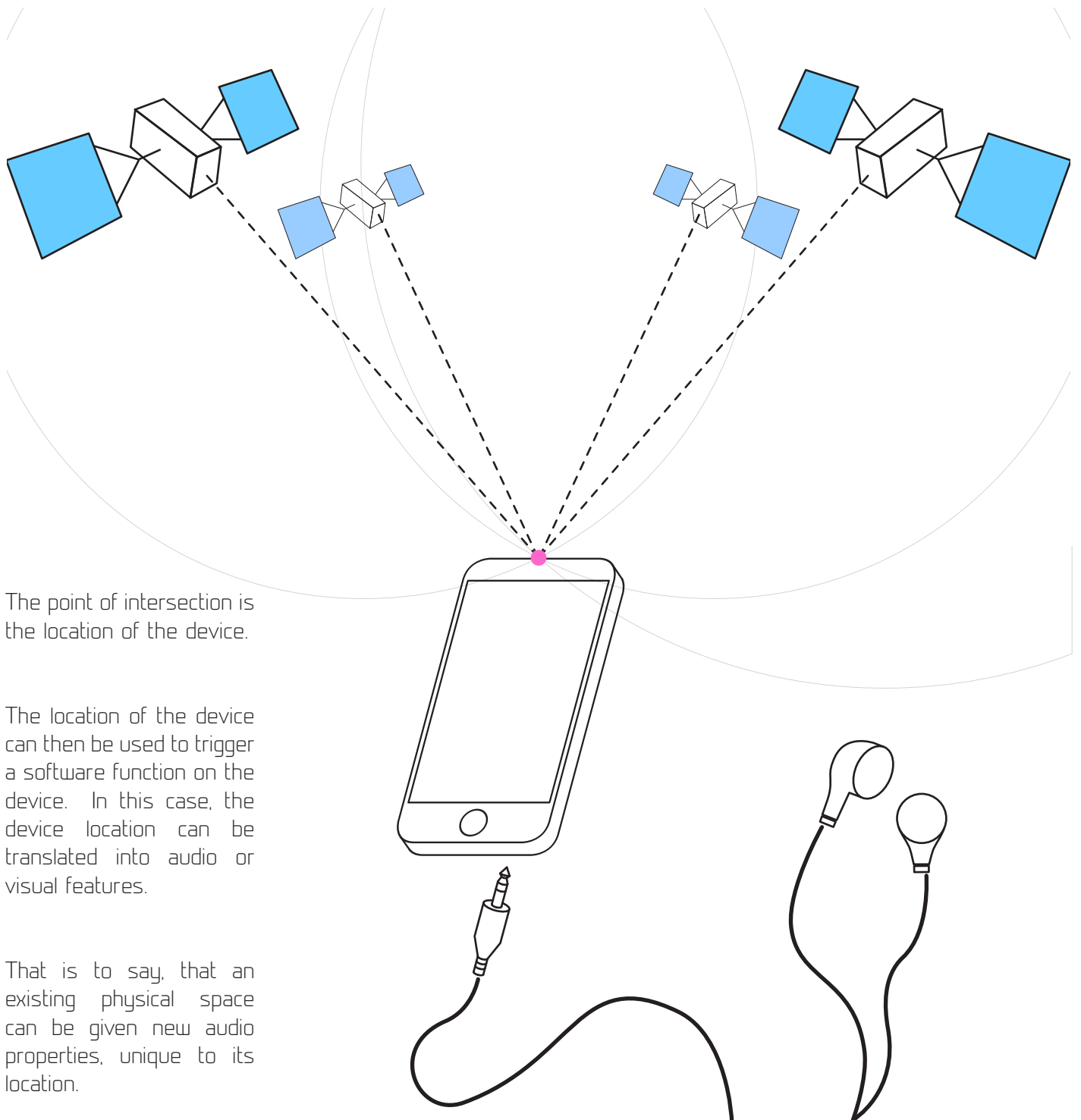
The device calculates its distance from the satellite (d).

$$d = c \times (t_2 - t_1)$$

When the device has signal from a minimum of 4 satellites it can calculate the point of intersection of the surfaces of spheres whose origins are the satellite locations and whose radii are the distance to the device.

source ⁴

LOCATION SPECIFIC SOUND & VISION



The point of intersection is the location of the device.

The location of the device can then be used to trigger a software function on the device. In this case, the device location can be translated into audio or visual features.

That is to say, that an existing physical space can be given new audio properties, unique to its location.

TESTING GPS ACCURACY

The accuracy of the GPS system varies due to the following sources of error:

- Receiver Algorithm
- Device Interference
- Refraction of radio waves in the atmosphere
- Irregularities in satellite orbit
- Clock errors
- Calculation errors
- Reflection of radio waves in urban areas
- Spacetime curvature

Although the performance of GPS in a specific location is not a fixed constant, some areas perform better than others with apparent consistency.

The GPS performance of a device is not proportionate to the overall specification, as advanced models can generate more internal interference.

KEY:

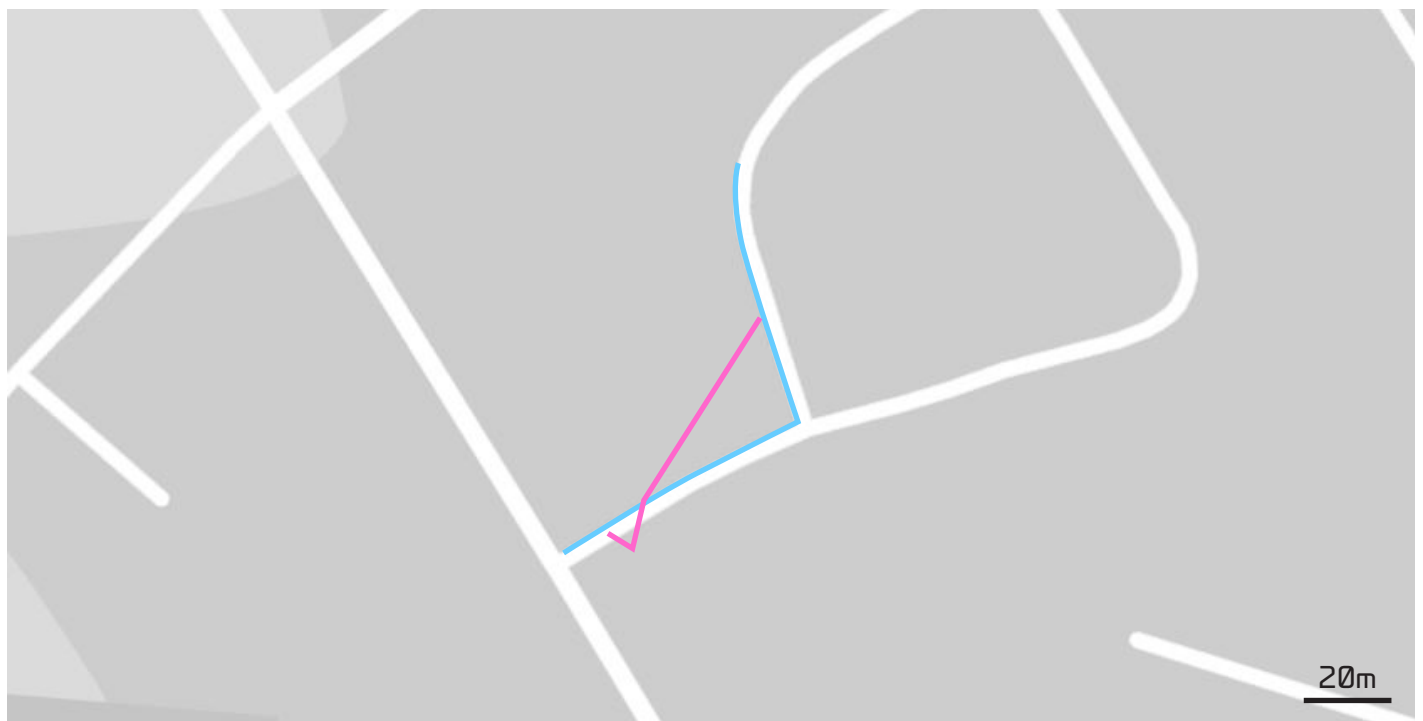
Route walked by user 

Route recorded by GPS 

Timeouts: 5,

OS: Android, Version: 4.1.2, Model: GT-I8190N

distance	accuracy	speed	heading	secs	latitude	longitude
25	10	0	156		53.44968293	-2.282519722
25	10	0	156	0	53.44968293	-2.282519722
38	10	0	238	36	53.44932523	-2.282886095
38	10	0	238	0	53.44932523	-2.282886095
38	10	0	238	0	53.44932523	-2.282886095
45	10	0	227	7	53.44923835	-2.282926161
45	10	0	227	0	53.44923835	-2.282926161
45	10	0	227	0	53.44923835	-2.282926161
48	10	0	164	6	53.4492661	-2.28300537



Timeouts: 4,

OS: Android, Version: 4.1.2, Model: GT-I8190N

distance	accuracy	speed	heading	secs	latitude	longitude
89	20	0	0		43.7051465	7.252650009
89	20	0	0	0	43.7051465	7.252650009
-	-	-	-	-	-	-
89	20	0	0	0	43.7051465	7.252650009
37	10	0	272	66	43.70528472	7.252013152
37	10	0	272	0	43.70528472	7.252013152
-	-	-	-	-	-	-
37	10	0	272	0	43.70528472	7.252013152
37	10	0	272	0	43.70528472	7.252013152



BELGRADE

v.01 t.01

Timeouts: 0,

OS: Android, Version: 4.3, Model: GT-19300

distance	accuracy	speed	heading	secs	latitude	longitude
5	12	0	0		44.81285742	20.47185695
5	8	0	0	1	44.81285742	20.47185695
5	12	0	0	2	44.81285742	20.47185695
5	8	0	0	1	44.81285742	20.47185695
5	8	0	0	2	44.81285158	20.47184138
5	8	0	0	1	44.81284533	20.47181879
7	12	0	0	2	44.81284498	20.47178758
7	6	0	0	1	44.81284498	20.47178757
7	8	0	0	2	44.81284498	20.47178757
8	6	0	0	1	44.81284367	20.47177467
9	8	0	0	2	44.81284414	20.47176517
9	6	0	0	1	44.81284414	20.47176518
9	6	0	0	2	44.81284414	20.47176518
9	8	0	0	1	44.81284414	20.47176518



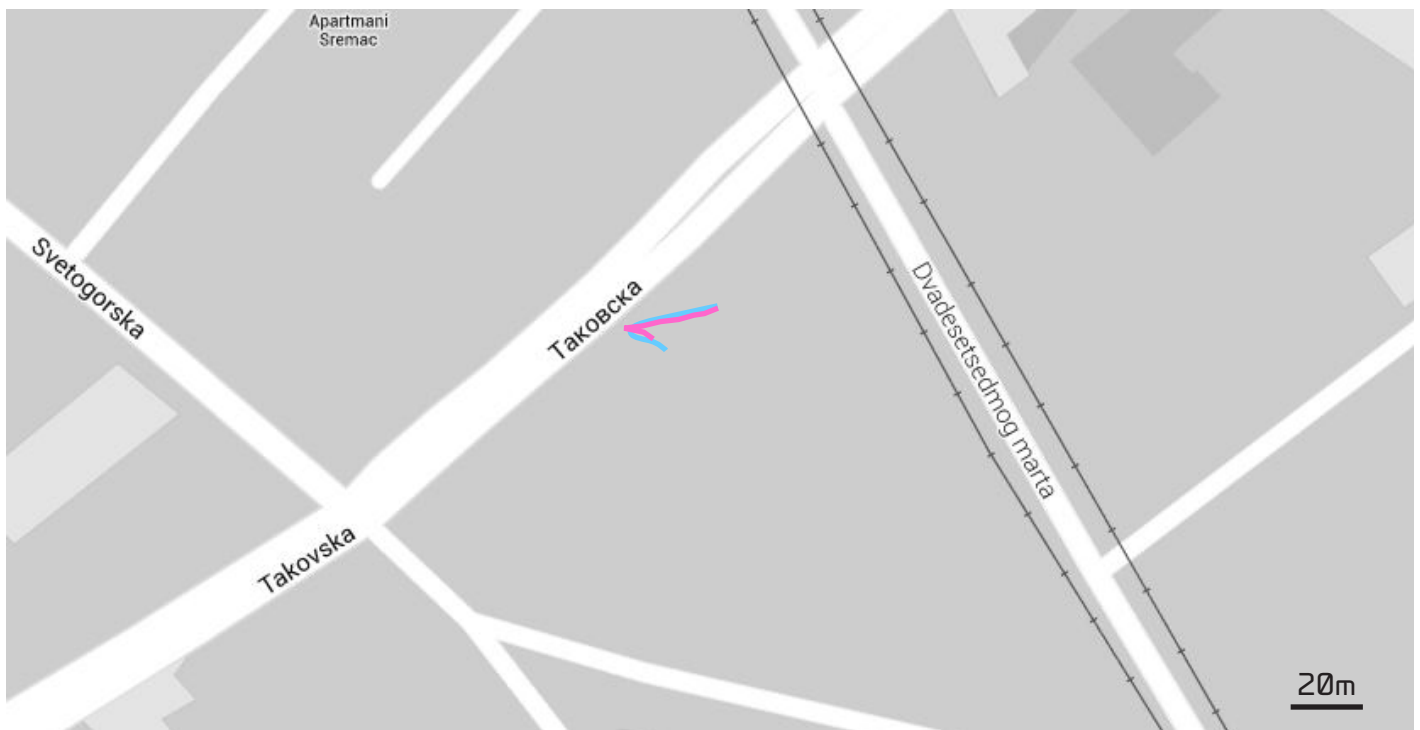
BELGRADE

v.01 t.02

Timeouts: 0,

OS: Android, Version: 4.3, Model: GT-19300

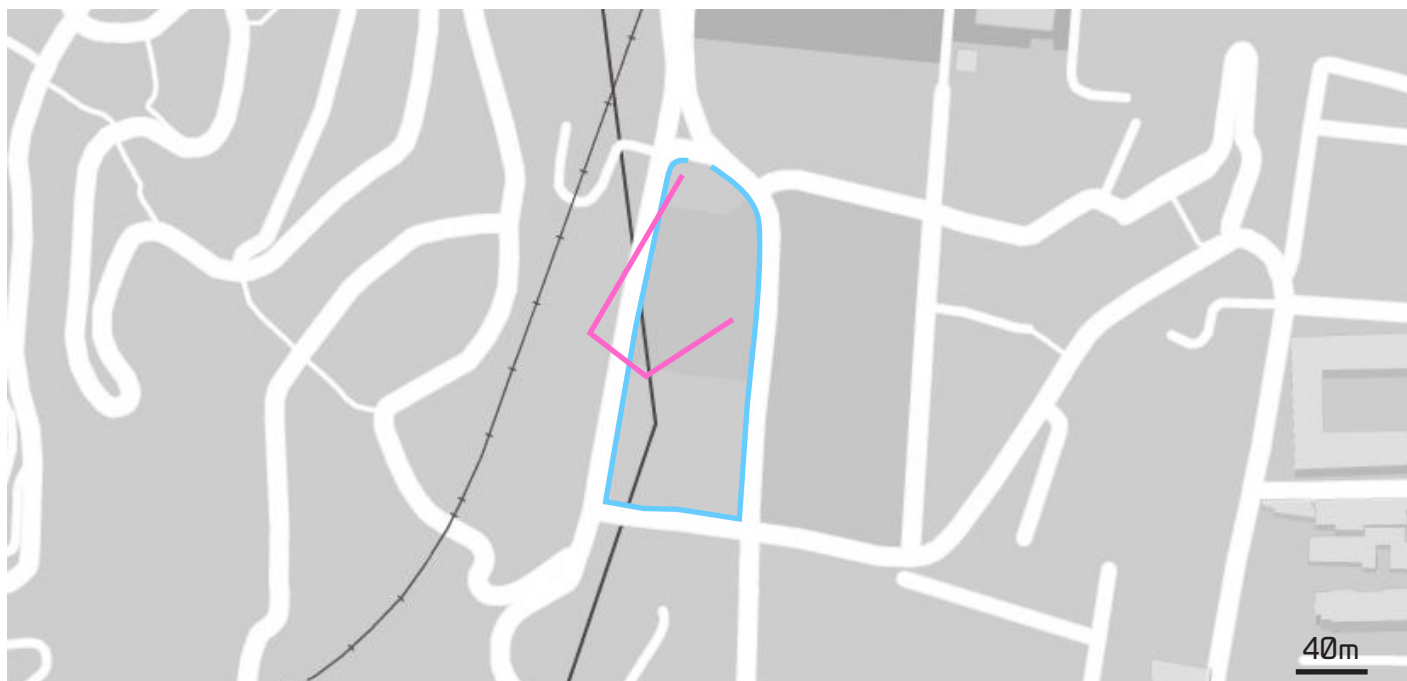
distance	accuracy	speed	heading	secs	latitude	longitude
10	32	0	0		44.81277885	20.47175317
10	32	0	0	1	44.81277885	20.47175317
10	32	0	0	1	44.81277885	20.47175317
13	16	0	0	2	44.81288399	20.4717337
13	16	0	0	0.8	44.81288399	20.4717337
13	8	0	0	2	44.81288399	20.4717337
13	8	0	0	1	44.81288399	20.4717337
13	8	0	0	2	44.81288399	20.4717337
13	8	0	0	1	44.81288399	20.4717337
13	8	0	0	2	44.81288399	20.4717337
13	12	0	0	1	44.81288399	20.4717337
13	8	0	0	2	44.81288399	20.4717337
13	8	0	0	1	44.81288399	20.4717337
13	8	0	0	2	44.81288399	20.4717337



Timeouts: 2,

OS: Android, Version: 4.1.2, Model: GT-I8190N

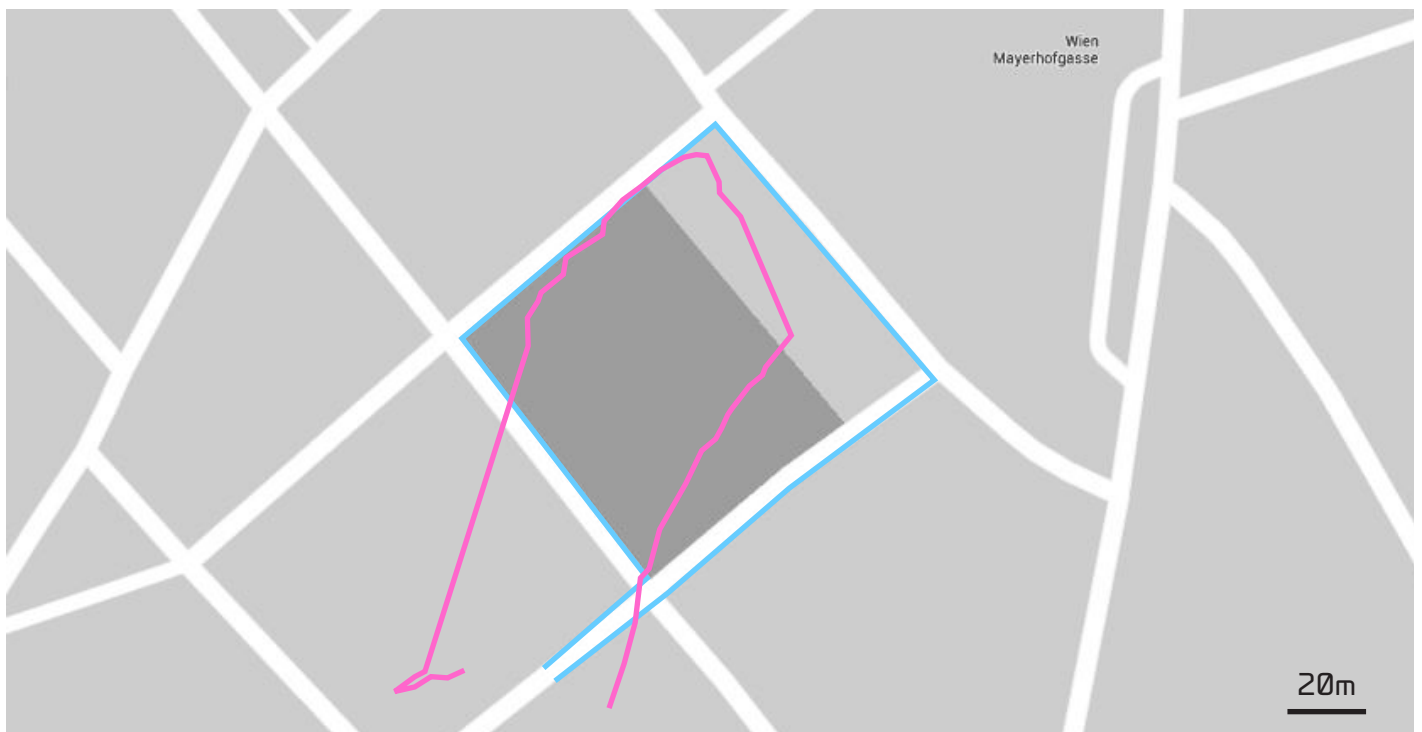
distance	accuracy	speed	heading	secs	latitude	longitude
38	30	0	18		43.7053441	7.251090389
38	30	0	18	0	43.7053441	7.251090389
-	-	-	-	-	-	-
38	30	0	18	0	43.7053441	7.251090389
111	15	0	321	137	43.70462313	7.2504941
111	15	0	321	0	43.70462313	7.2504941
-	-	-	-	-	-	-
111	15	0	321	0	43.70462313	7.2504941
108	15	0	318	138	43.70443353	7.250862904
108	15	0	318	0	43.70443353	7.250862904
-	-	-	-	-	-	-
108	15	0	318	0	43.70443353	7.250862904
65	15	0	271	82	43.70469128	7.251401441



Timeouts: 17,

OS: Android, Version: 2.3.7, Model: MB525

distance	accuracy	speed	heading	secs	latitude	longitude
166	27.97498322	0	0		48.19064856	16.36518717
166	27.97498322	0	0	1.1	48.19064856	16.36518717
166	27.97498322	0	0	2	48.19064856	16.36518717
166	27.97498322	0	0	1	48.19064856	16.36518717
161	27.97498322	0	0	2	48.19071293	16.36507988
161	27.97498322	0	0	1	48.19071293	16.36507988
161	27.97498322	0	0	2	48.19071293	16.36507988
161	27.97498322	0	0	1	48.19071293	16.36507988
154	27.97498322	0	0	2	48.19078803	16.36499405
154	27.97498322	0	0	1	48.19078803	16.36499405
154	27.97498322	0	0	2	48.19078803	16.36499405
154	27.97498322	0	0	2	48.19078803	16.36499405
145	9.487171173	0	0	1	48.1908524	16.36510134
145	9.487171173	0	0	2	48.1908524	16.36510134



MANCHESTER

v.02 t.01

Timeouts: 3,

OS: Android, Version: 4.1.2, Model: GT-I8190N

distance	accuracy	speed	heading	secs	latitude	longitude
88	10	0	52		53.45025671	-2.282175058
88	10	0	52	0	53.45025671	-2.282175058
88	10	0	52	0	53.45025671	-2.282175058
93	5	0	69	6	53.45029213	-2.28203089
93	5	0	69	0	53.45029213	-2.28203089
93	5	0	69	0	53.45029213	-2.28203089
99	10	0	106	6	53.45032121	-2.281924188
99	10	0	106	0	53.45032121	-2.281924188
99	10	0	106	0	53.45032121	-2.281924188
104	10	0	126	6	53.450335	-2.281750431
104	10	0	126	0	53.450335	-2.281750431
104	10	0	126	0	53.450335	-2.281750431
99	5	0	164	7	53.45022348	-2.281561252
99	5	0	164	0	53.45022348	-2.281561252



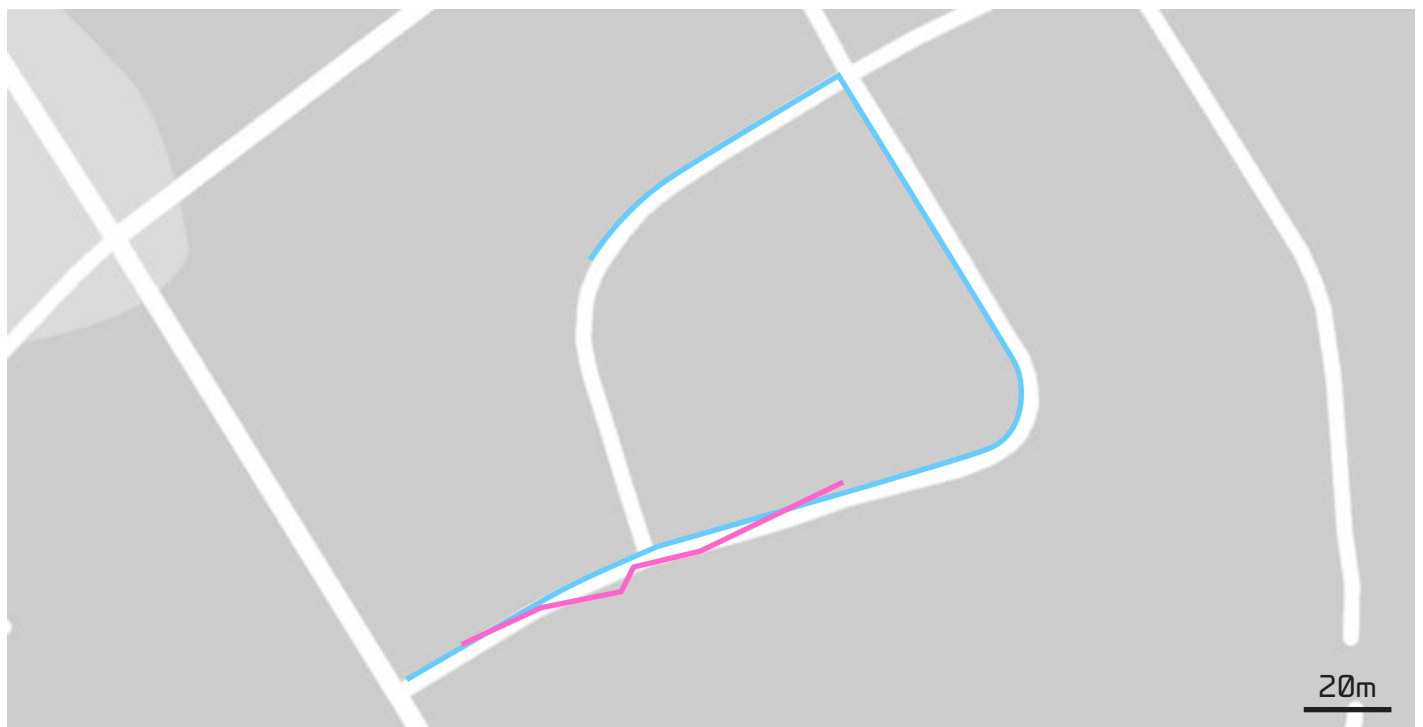
MANCHESTER

v.02 t.02

Timeouts: 3,

OS: Android, Version: 4.1.2, Model: GT-I8190N

distance	accuracy	speed	heading	secs	latitude	longitude
44	10	0	67		53.44930151	-2.282974524
44	10	0	67	0	53.44930151	-2.282974524
44	10	0	67	0	53.44930151	-2.282974524
37	10	0	47	6	53.44932674	-2.282868912
37	10	0	47	0	53.44932674	-2.282868912
37	10	0	47	0	53.44932674	-2.282868912
28	10	0	87	6	53.44936517	-2.282748716
28	10	0	87	0	53.44936517	-2.282748716
18	10	0	73	6	53.44938784	-2.282597674
18	10	0	73	0	53.44938784	-2.282597674
18	10	0	73	0	53.44938784	-2.282597674
9	10	0	85	6	53.44940507	-2.282447554
9	10	0	85	0	53.44940507	-2.282447554
9	10	0	85	0	53.44940507	-2.282447554



TESTING MEDIA PLAYBACK

In order for the user to experience a composition as intended, the functionality of various audio processes must be tested:

Synchronisation - Audio clips should be triggered accurately so that they are played in time with one another.

Continuity - Audio clips should play continuously so that they retain their synchronisation throughout playback.

Channel Mixing - Audio clips should be mixed into each other without resetting when a new clip is triggered.

Size & Location - Audio clips should be of a small enough size so that they can be downloaded and accessed from a local disk.

Testing the functionality of these processes required a very simple composition whose elements were easily distinguishable from one another, whose waveforms would not interfere with one another and whose timing was regular in order that all errors and irregularities be easily detected by the human ear.

I generated a simple four point, four sound sequence with a spoken timecode counting an eight bar loop.

The frequency spectrums of the four sounds do not overlap so that changes in the mix can be detected.

The timecode is embedded in every clip so that delays can be detected.

TEST SEQUENCE

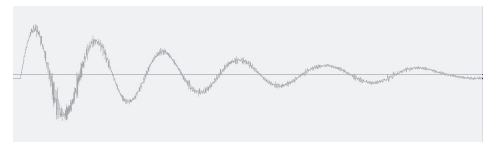


TEST SEQUENCE
1.333sec @ 90BPM

TEST TONES
SIN WAVE OSCILLATOR



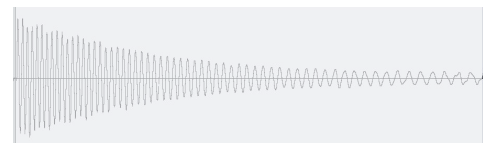
100Hz



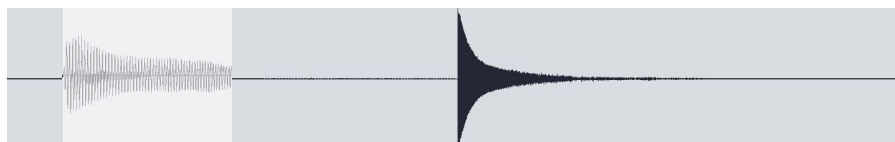
100Hz



1000Hz



1000Hz



4000Hz



4000Hz



16000Hz

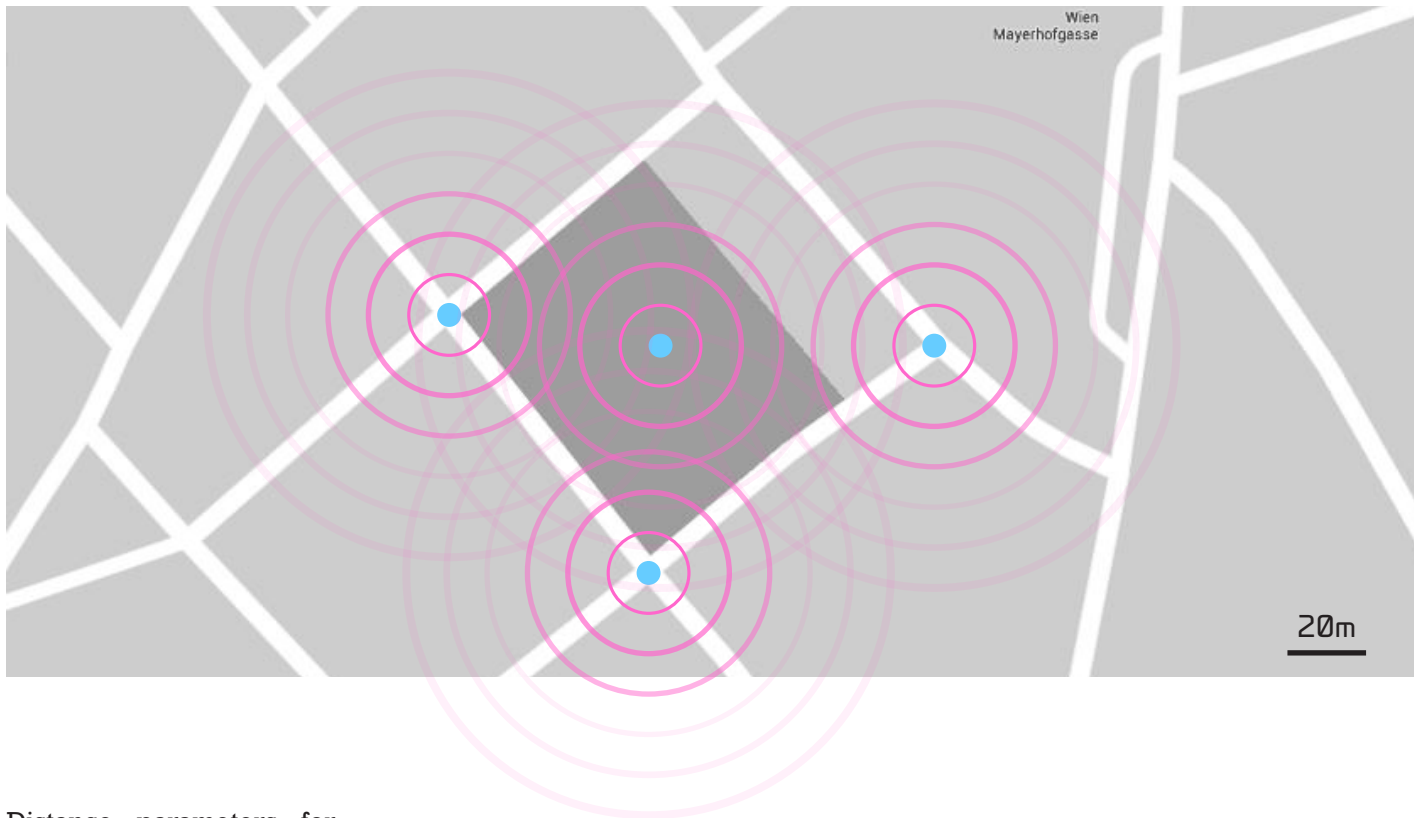


16000Hz



SPOKEN TIMECODE
8 BAR LOOP

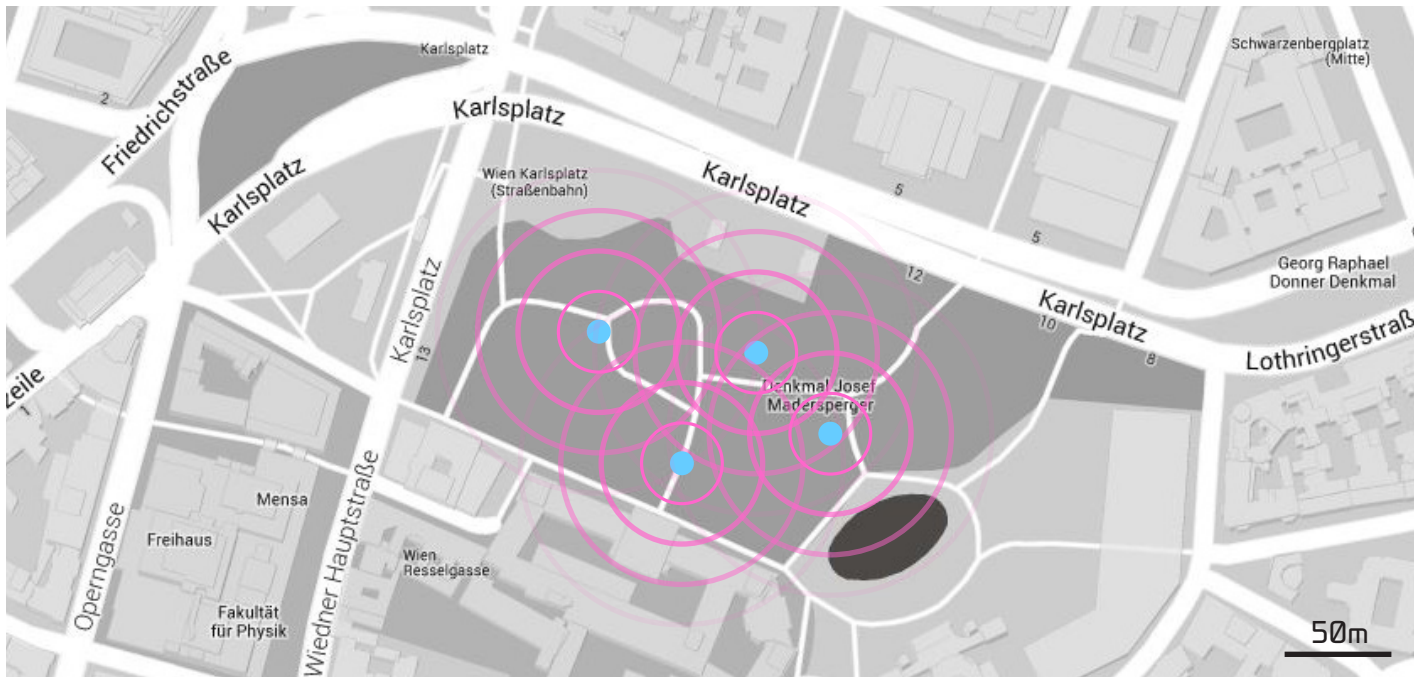
TEST SITE 01



Distance parameters for the test were:

Volume %	Distance m
100	0
0	60

TEST SITE 02



Distance parameters for the test were:

Volume %	Distance m
100	0
0	40

TEST FEEDBACK

The results of the test imply the following:

Synchronisation - Audio clips can be triggered accurately so that they at least start to play in time with one another, but a beatmatch algorithm cannot be integrated into the current version until a more advanced version can be funded.

Continuity - Audio clips cannot play continuously without desynchronising to some extent during playback. This is due to the processing power of mobile devices and it means that the mixing technique must be revised and an alternative method tested.

Channel Mixing - Audio clips can only be triggered from 0.00 seconds, therefore the fade in/out must be synthesised with a time delay rather than controlled directly by the GPS.

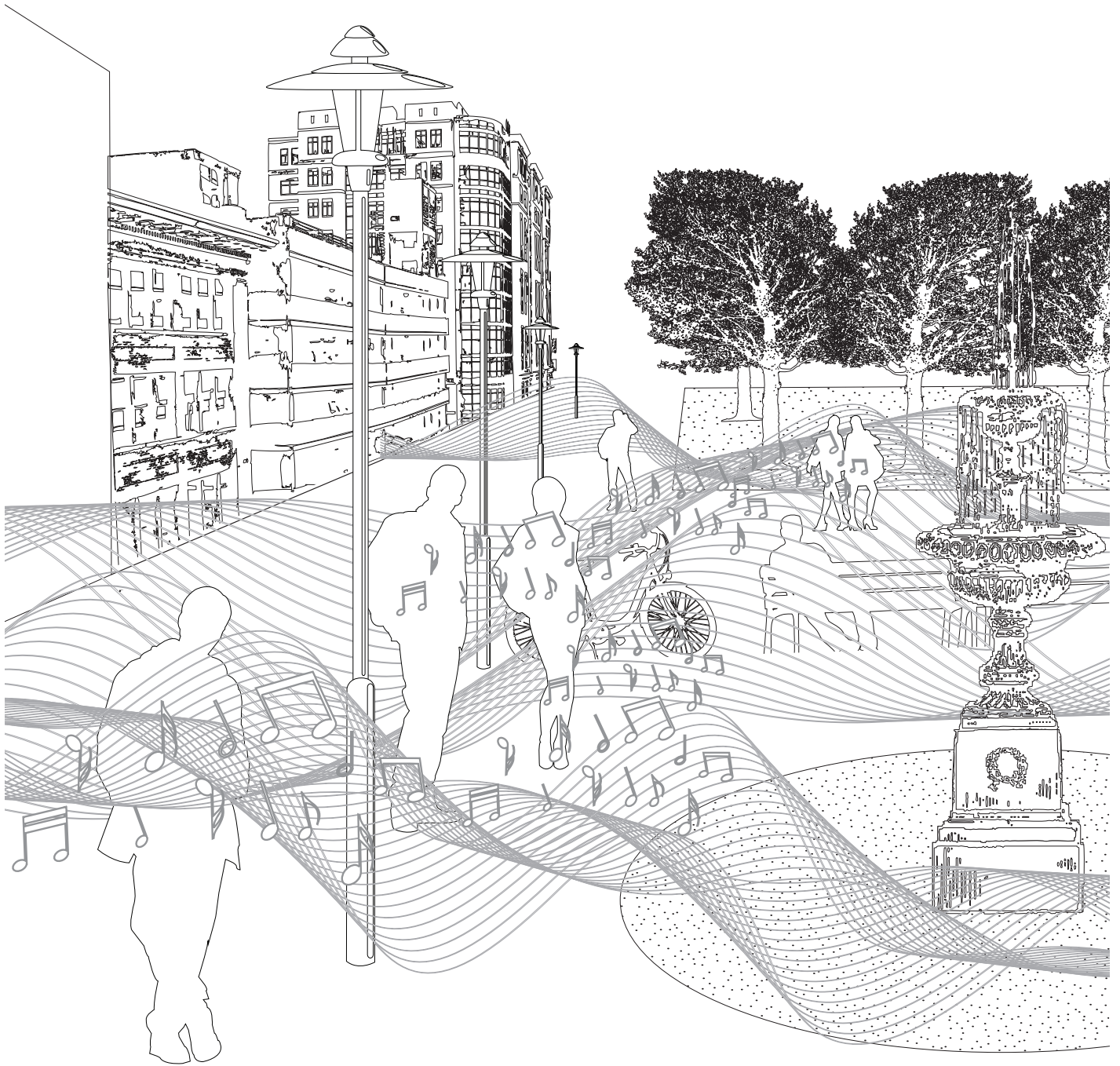
Size & Location - Audio clips must be packed into the application and installed with the application until a more advanced version can be funded.

The GPS performance was adequate enough to support a more complex composition, but the precision of the media playback was riddled with delay.

Reducing the Length of clips would increase the frequency of resetting to 0.00. Higher reset frequency can act like a low quality beatmatch engine.



8. WHAT ARE THE CULTURAL OBJECTIVES?



The design of good public spaces is an important topic in architecture because it has a huge impact on the life of a city.

As we begin to turn it into a digital playground through wearable technology, we must be careful not to turn it into retail space.

If we can learn to engage with the digital aspect of public space, we can nurture an environment that delivers creative, humane and enjoyable experiences, just as we have learnt to do with conventional space. We modulate light, climate and texture to create things not only of comfort, but of beauty.

What are the conditions we need to modulate in the cities of the future?

As people responsible for the creation of the built environment, architects have new tools at their disposal, beyond the conventional palette, to sculpt public space into magical places.

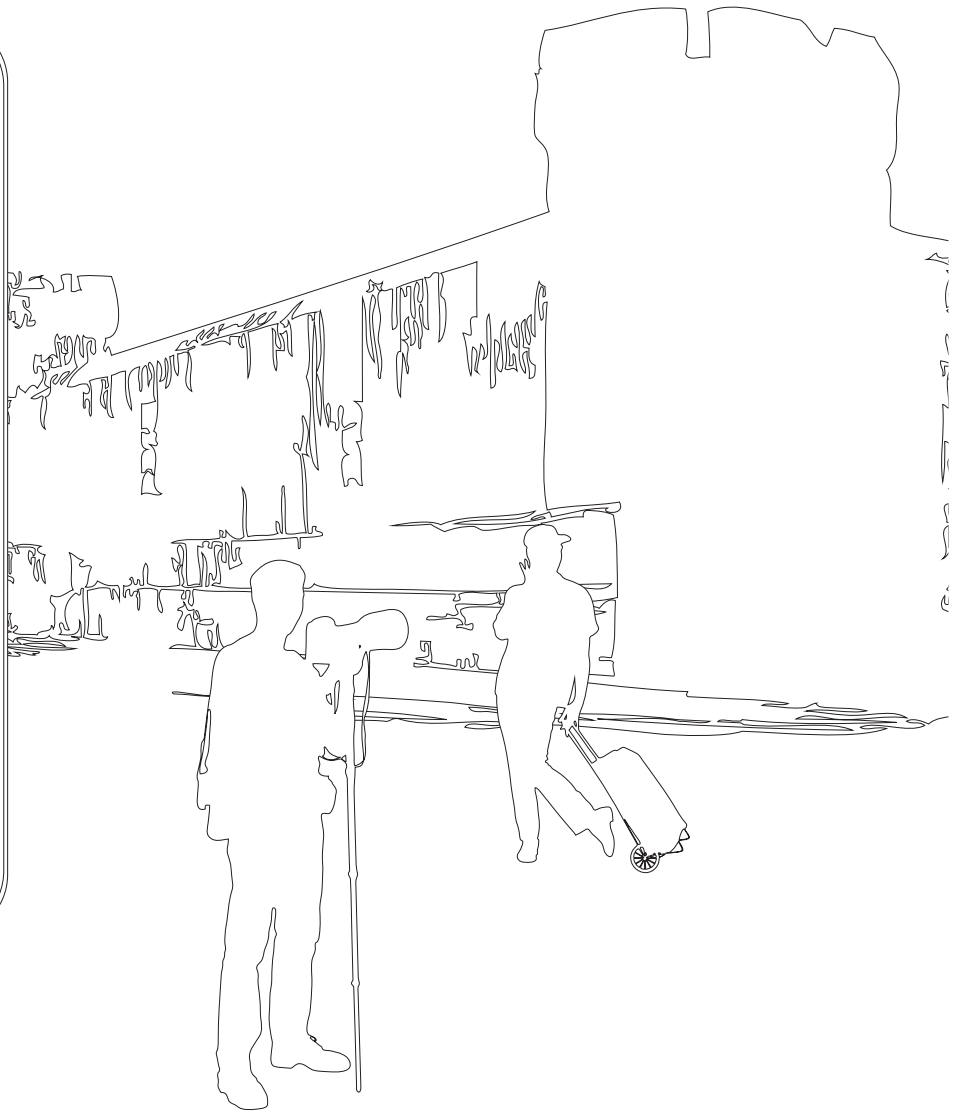


This leads to gamification, urban narratives and the idea of the city as a theatre, where games are played and stories are told not just through buildings, but through the hardware and software which we use to experience them.

Urban space has always been a forum for communication, but there is now a new type of infrastructure.

The idea of architecture as a cinematic experience is widely accepted by the establishment.

If we choose to utilise digital infrastructure, architects can become the directors of something more powerful than cinema - something more tangible than phenomenology, something that transforms citizens from viewers into users.



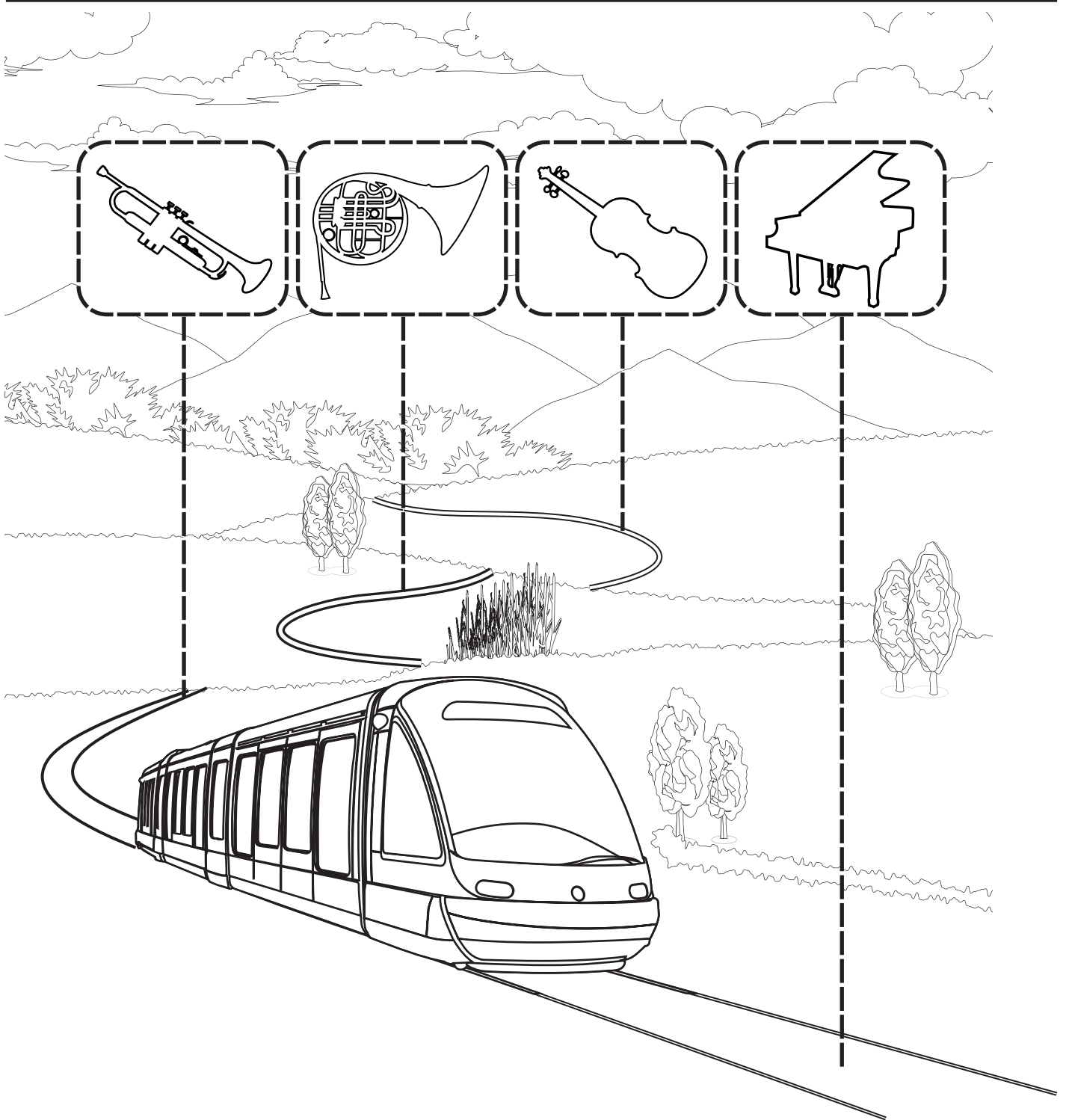
By employing digital strategies we can reveal the life of a building beyond the present.

The historical and cultural significance of a place can be communicated not with a commemorative plaque, as we are accustomed to, but through interaction. A building can be explored, rather than simply read.

In the context of tourism, heritage and conservation, a digital strategy could be used to protect a building that is under threat, generate funds to carry out conservation or repair work or educate people about the built environment.

Anything that generates an interest in architecture helps the profession.

In this way, the synergy between a digital experience and a conventional architectural one, is not just one of a new facade to an existing structure, but one of symbiosis, where the life of the building is enhanced and supported by the digital activities that help people engage with it.

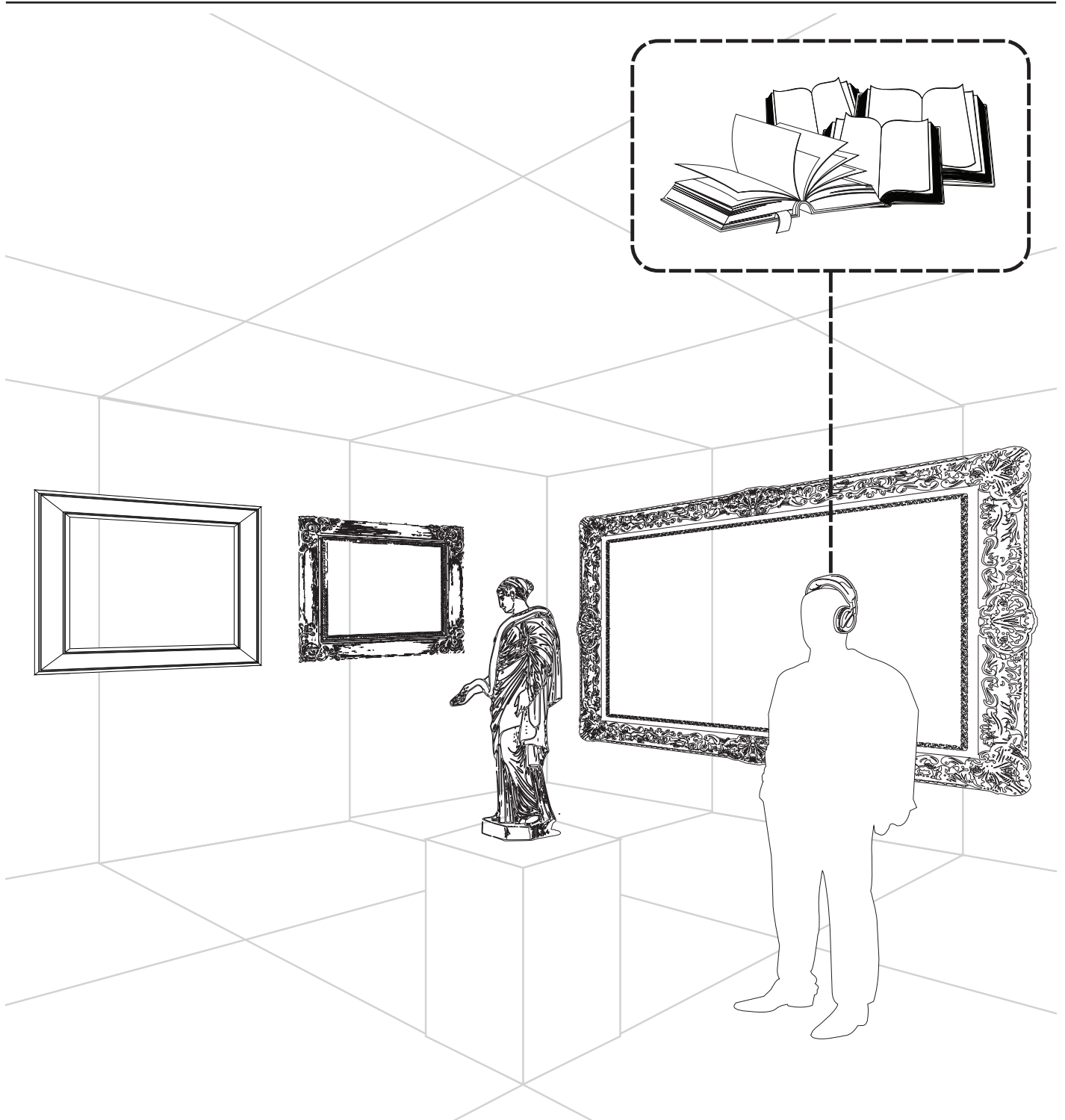


Beyond the city limits, the built environment continues in the form of transport, the architecture from which we experience the landscape we are traversing. Our phones remain connected and we are still online.

What kind of experience can we generate by combining these conditions?

The idea of journey is another significant notion in architecture.

Perhaps it is not just the journey through the city that can be enhanced by digital layers, but the journey between cities. These corridors of connectivity are extensions of urbanism.



Wherever architecture chooses to draw a line, marking out the extents of the discipline and the limits of practice, we can be sure that someone will alter the way we experience space.

If architects do not consider mobile applications an extension of architecture and seek to define principles that create safe space, as we do with fire regulations and accessibility, then the design of digital space will be regulated by business logic.

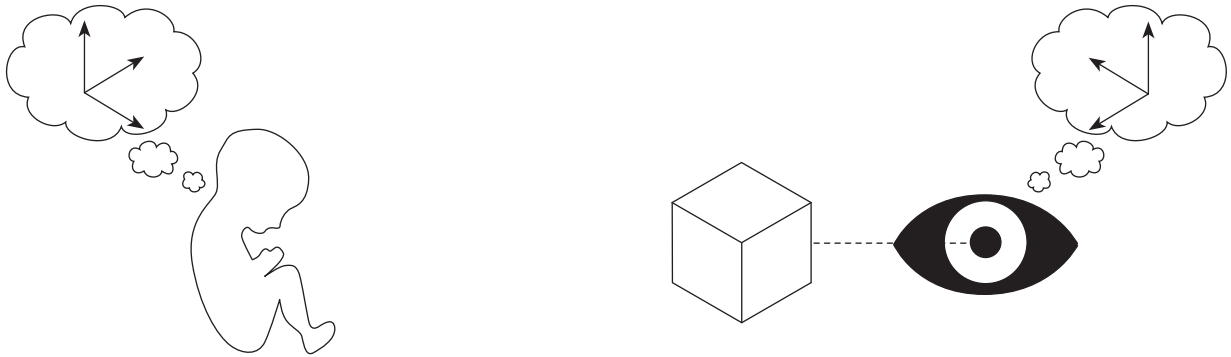
We will have to negotiate advertising space rather than educational space, consumer capitalism rather than ephemeral beauty.

If digital space is purely commercial, we will have to switch off in order to relax - but wouldn't it be nice if switching on was a pleasurable experience.

9. HOW DOES
ONE EXPERIENCE
A SEQUENCE OF
ATMOSPHERES?

"Most of the time our lives are organised by our everyday concerns. But every now and then we find ourselves jolted out of our complacency in the presence of something vastly more important than our immediate desires and interests, something not of this world. From Plato to Kant philosophers have tried to capture the peculiar way in which beauty dawns on us - like a sudden ray of sunlight or a surge of love. For Plato the only explanation of such an experience was its transcendental origin." ¹ - Roger Scruton

PICTORIAL SYNOPSIS OF ARGUMENTS FOR THE TRANSCENDENTAL AESTHETICS OF SPACE IN KANT'S CRITIQUE OF PURE REASON

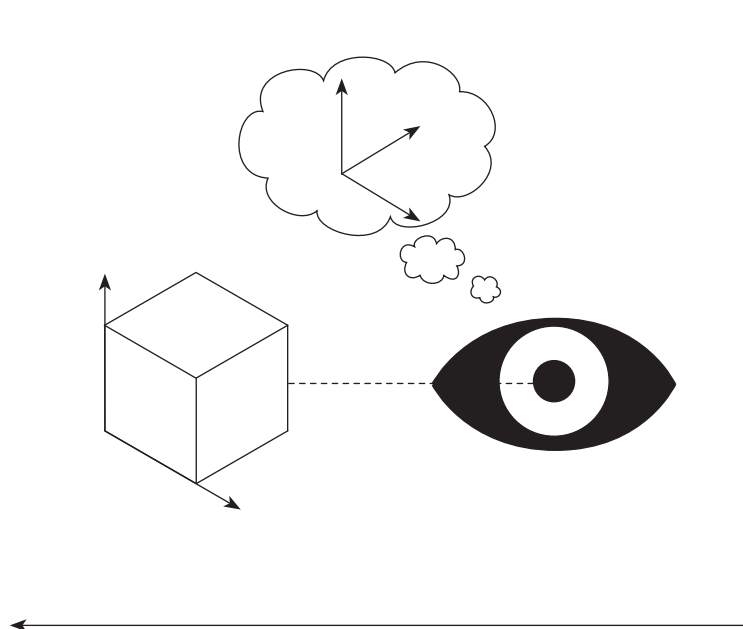


Perception of space must come from either a priori or a posteriori knowledge.

1

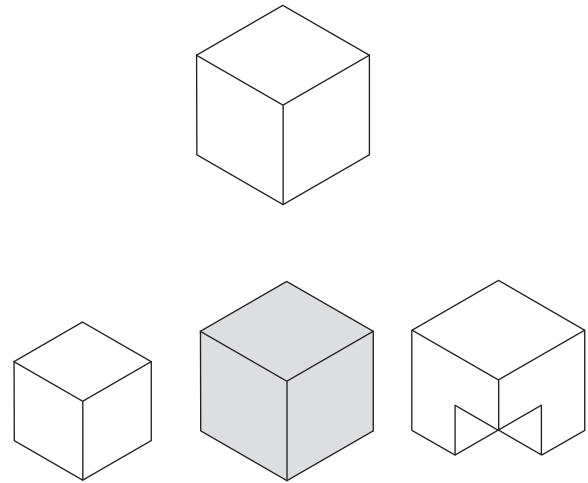
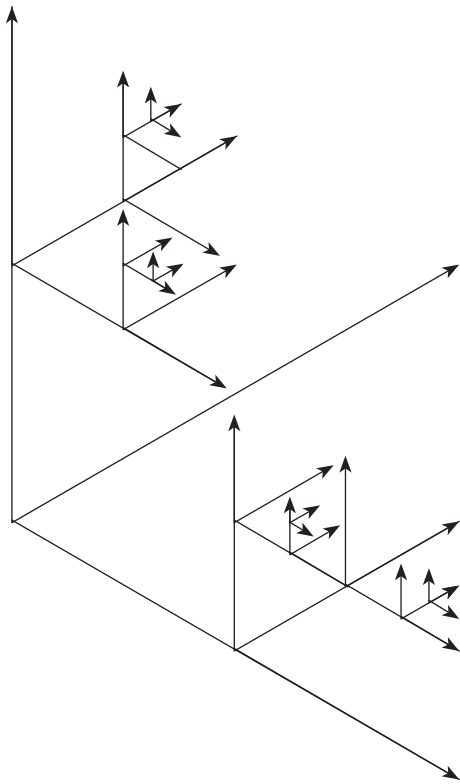
A posteriori knowledge would imply an initial separation. In order for there to be an initial separation, there would already have to exist an initial perception of space.

Therefore space must exist a priori.



2

Space is a condition for experience.

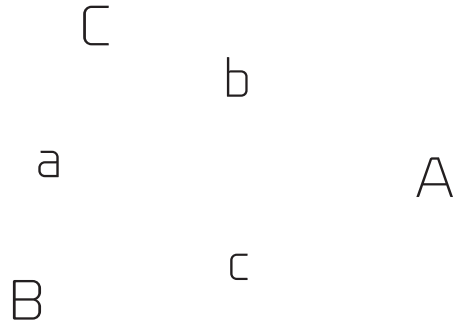
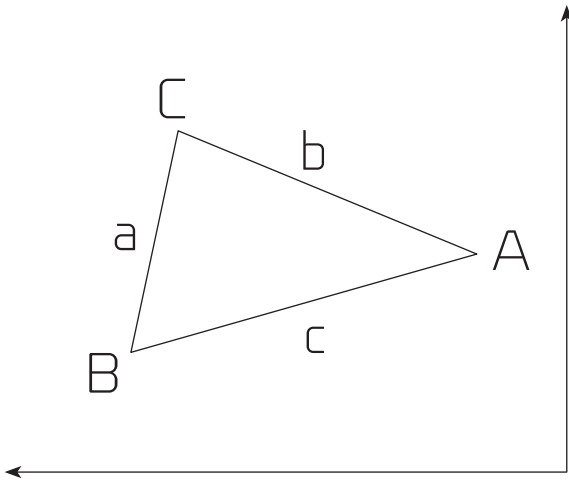


384

Space is an infinitely divisible intuition containing transferrable yet indivisible concepts within it.

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{\sin A} \quad \frac{b}{\sin B} \quad \frac{c}{\sin C}$$

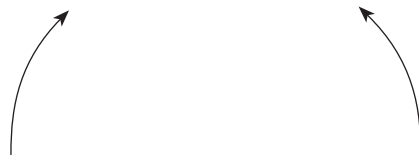
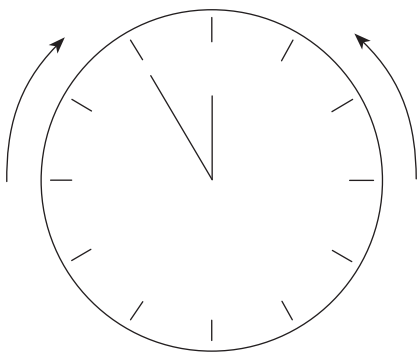


5

Geometry is not a posteriori, it consists of rules, not observations.

Geometry is not analytic, it refers to space, not itself.

Therefore, the a priori synthesis of geometry can only exist given an intuition of space.

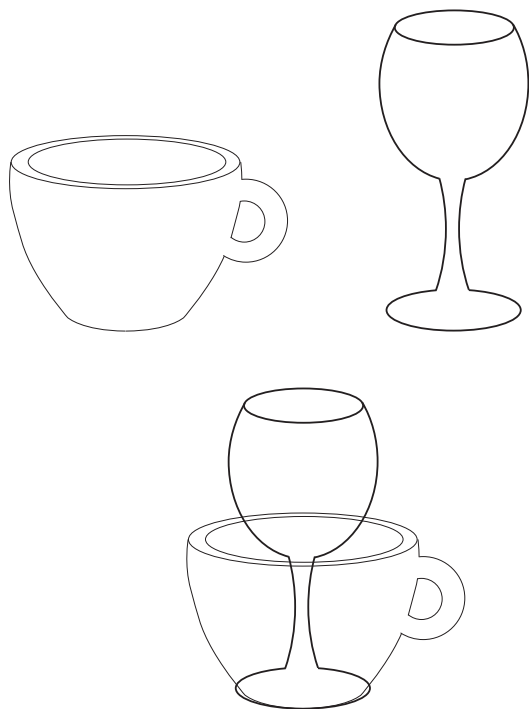


6

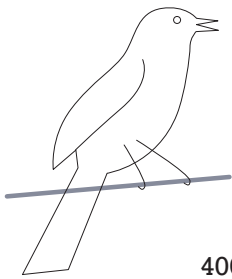
Without the concepts of space, our intuition of it remains.

source ²

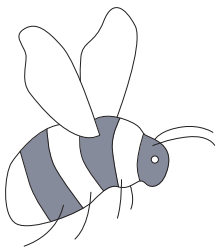
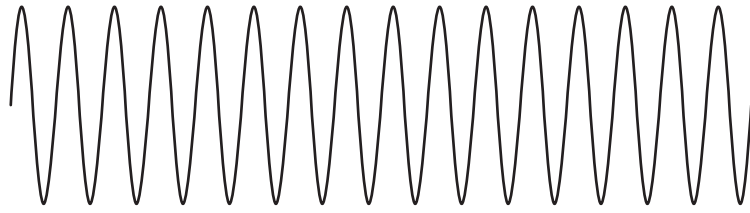
THE LINEARITY OF VISUAL SPACE



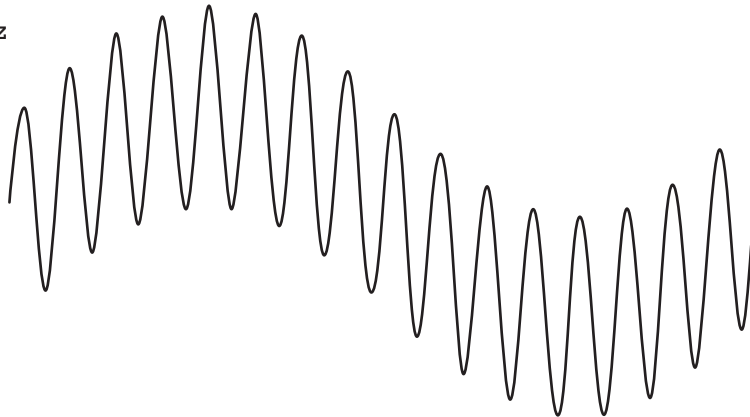
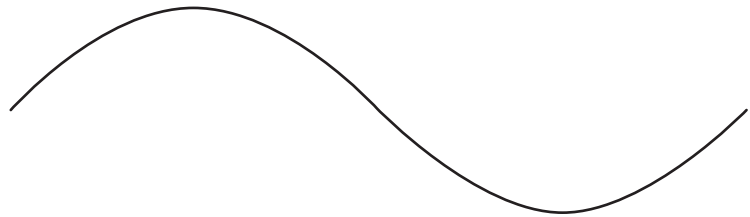
THE SIMULTANEITY OF ACOUSTIC SPACE



4000 Hz



250 Hz



source ³

USER EXPERIENCE CONCEPT

The principle from which the user experience is derived is the simultaneity of acoustic space.

If acoustic experiences can be layered, non-linear environments that we decode in the brain, rather than the ear, they can be exploited as a vehicle for transport to alternative environments.

Using Kant's definition of space as an a priori intuition, the strategy is to overlay fictional space on existing urban space, using acoustic space as an conduit.

REAL URBAN SPACE

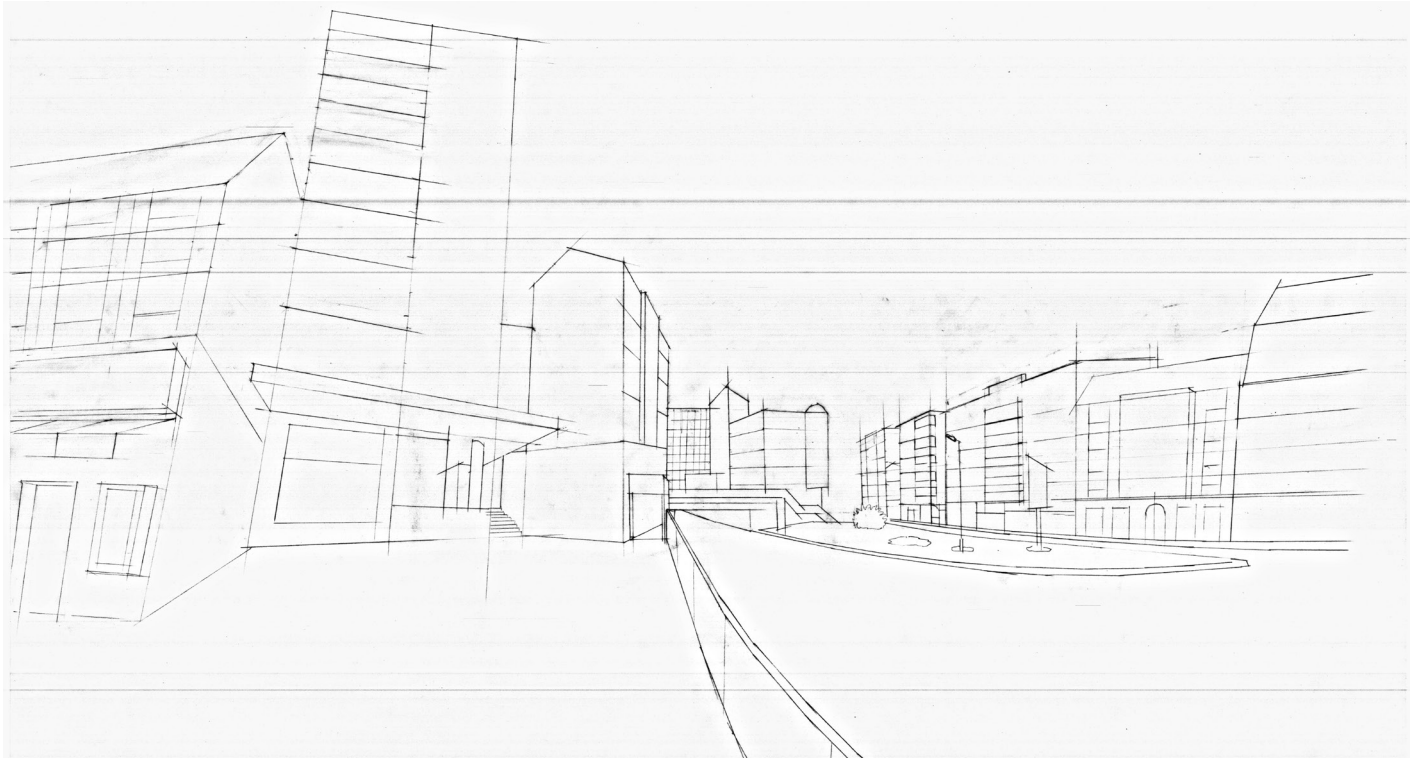


Zeleni Venac Street, Belgrade

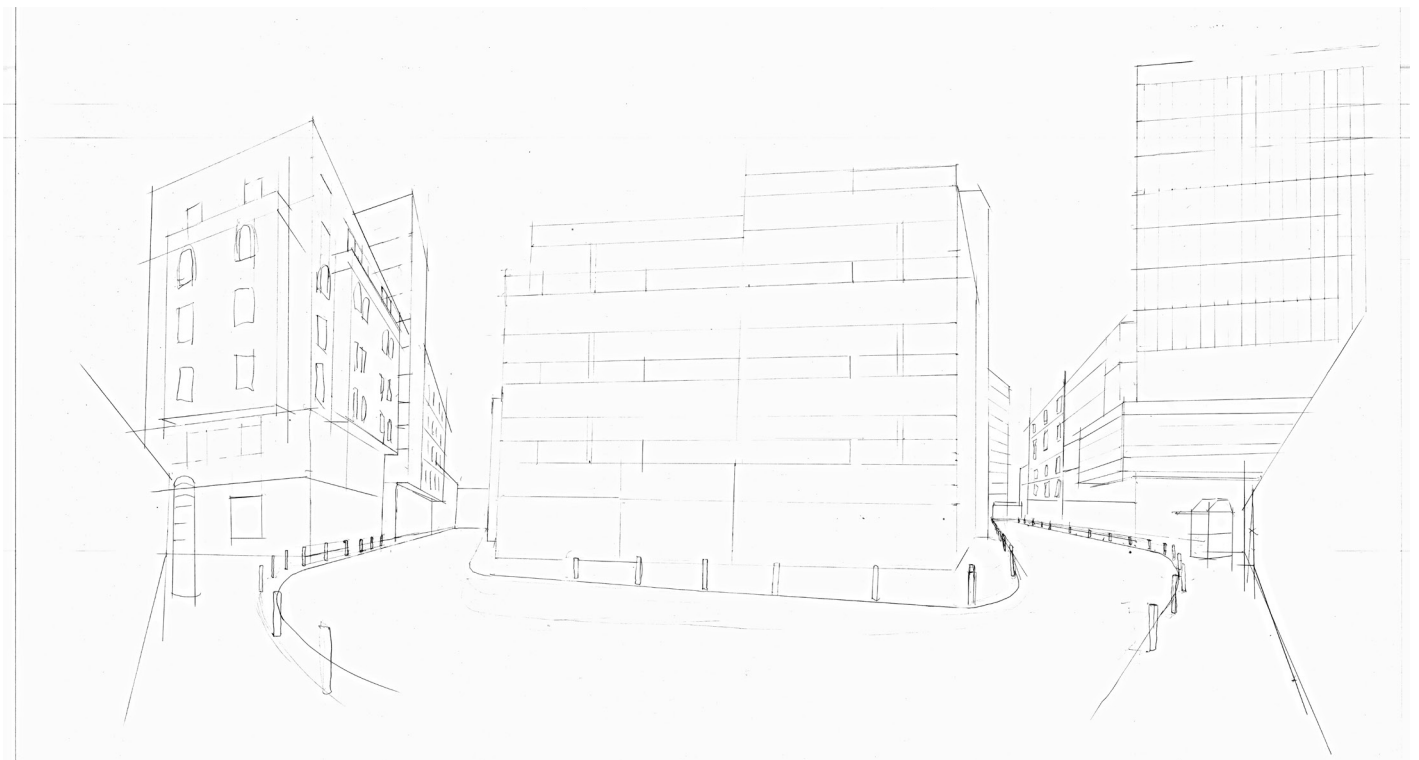


Marshall Birjuzov Street, Belgrade

REAL URBAN SPACE

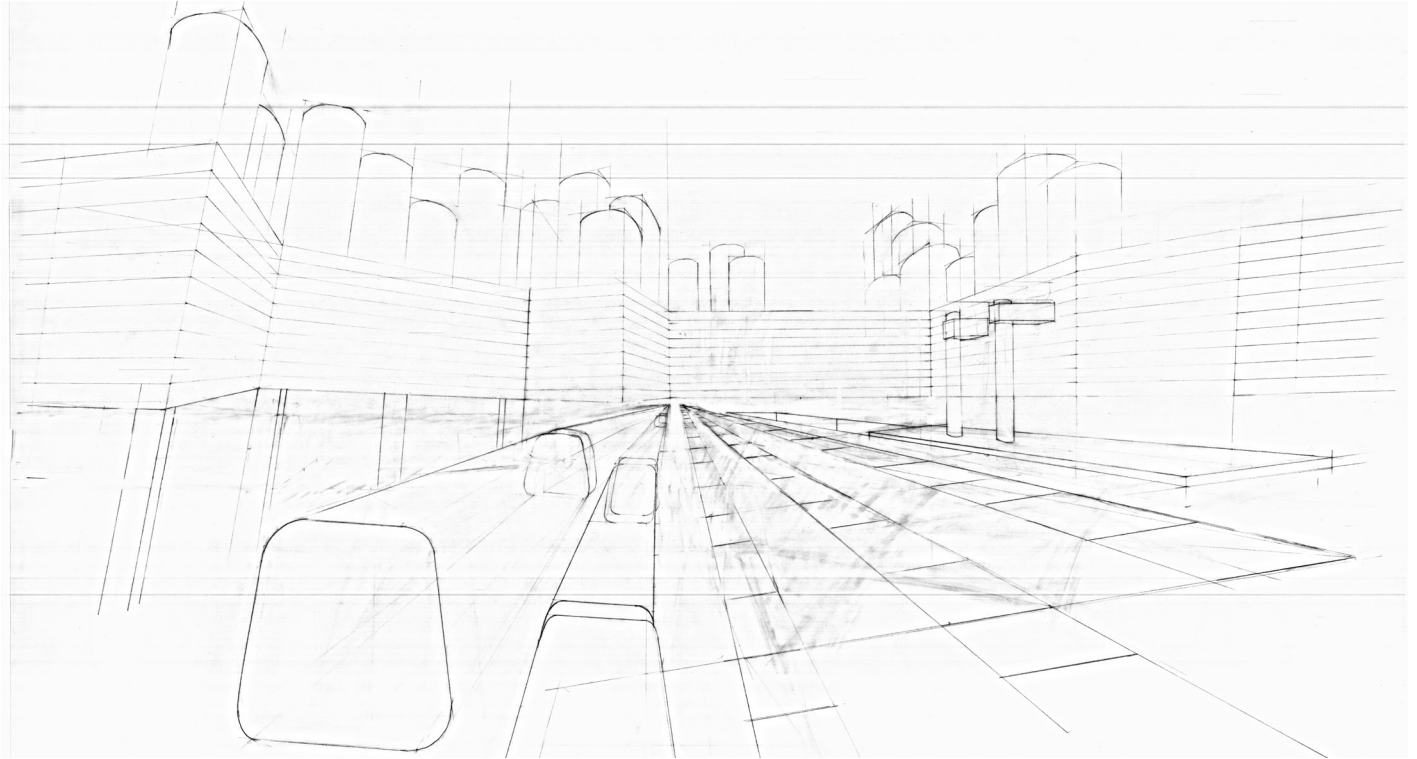


Zeleni Venac Street, Belgrade

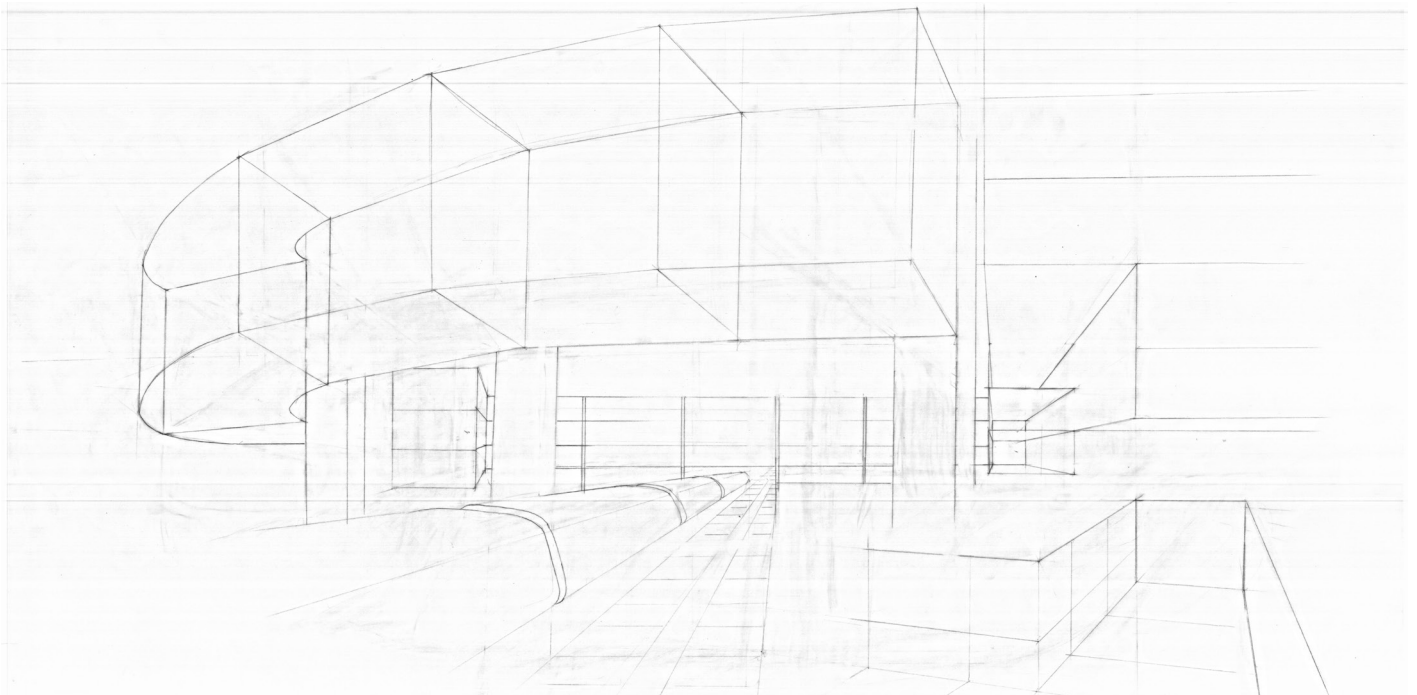


Marshall Birjuzov Street, Belgrade

FICTIONAL OPERATIC SPACE

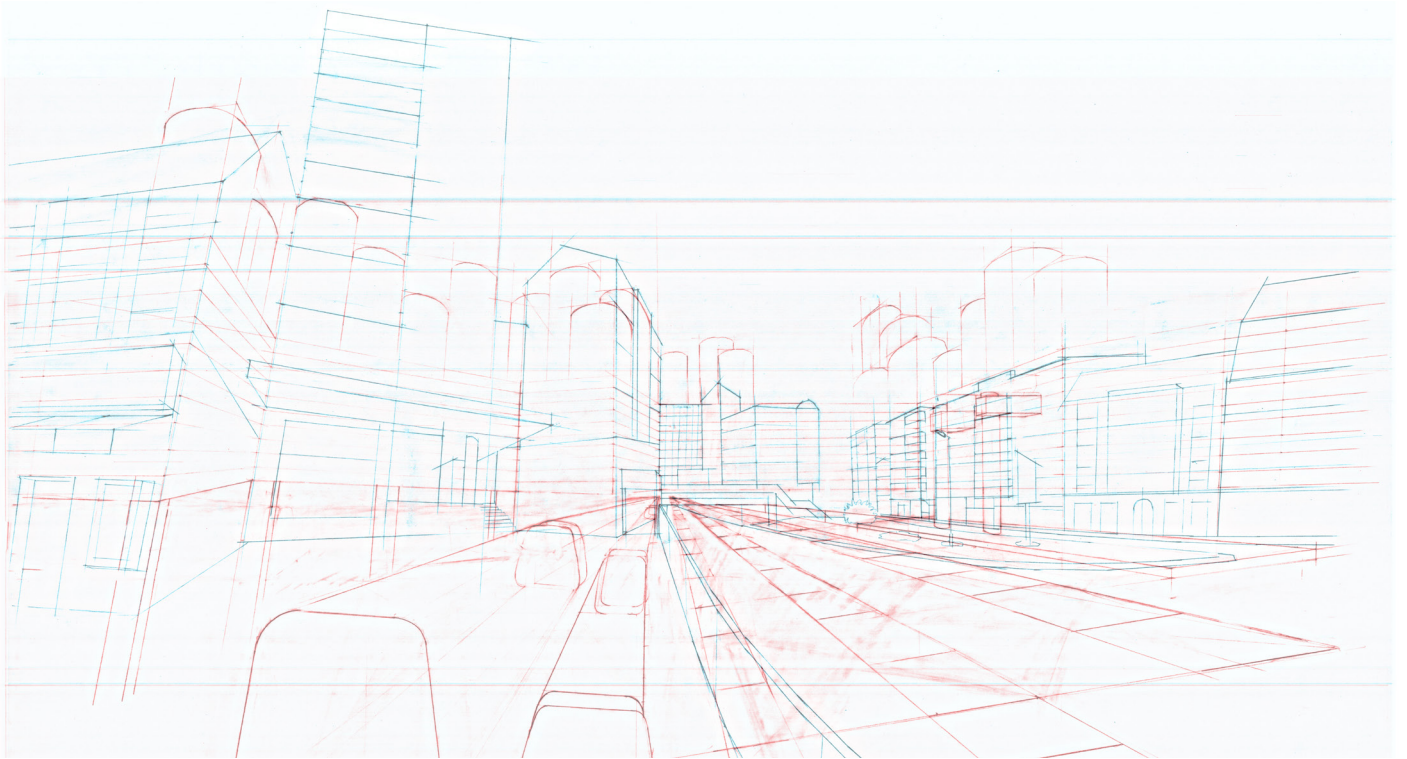


Transport Platform 1100, Nordizk

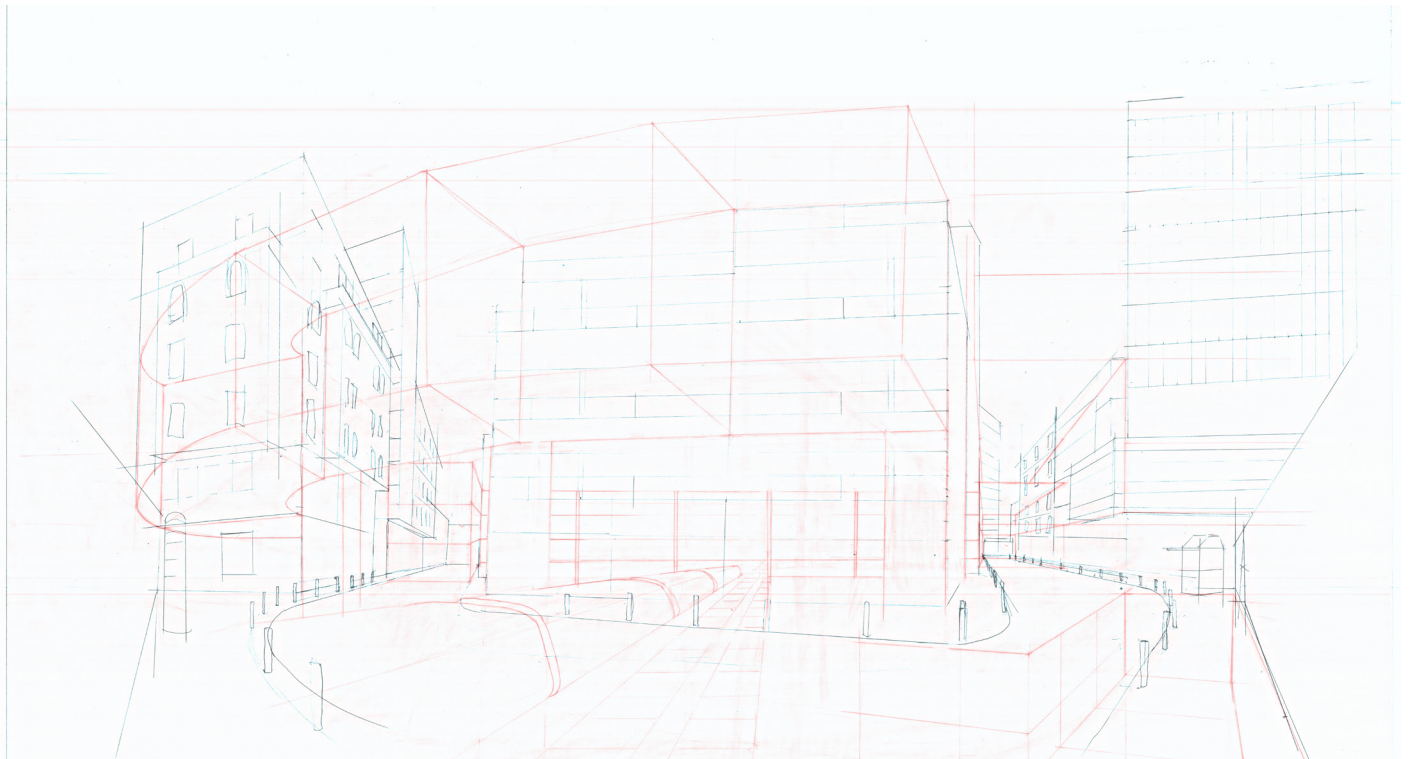


Commuter Interchange 550, Nordizk

SUPERIMPOSITION OF REAL URBAN SPACE AND FICTIONAL OPERATIC SPACE



Zeleni Venac Street, Belgrade and Transport Platform 1100, Nordizk experienced simultaneously



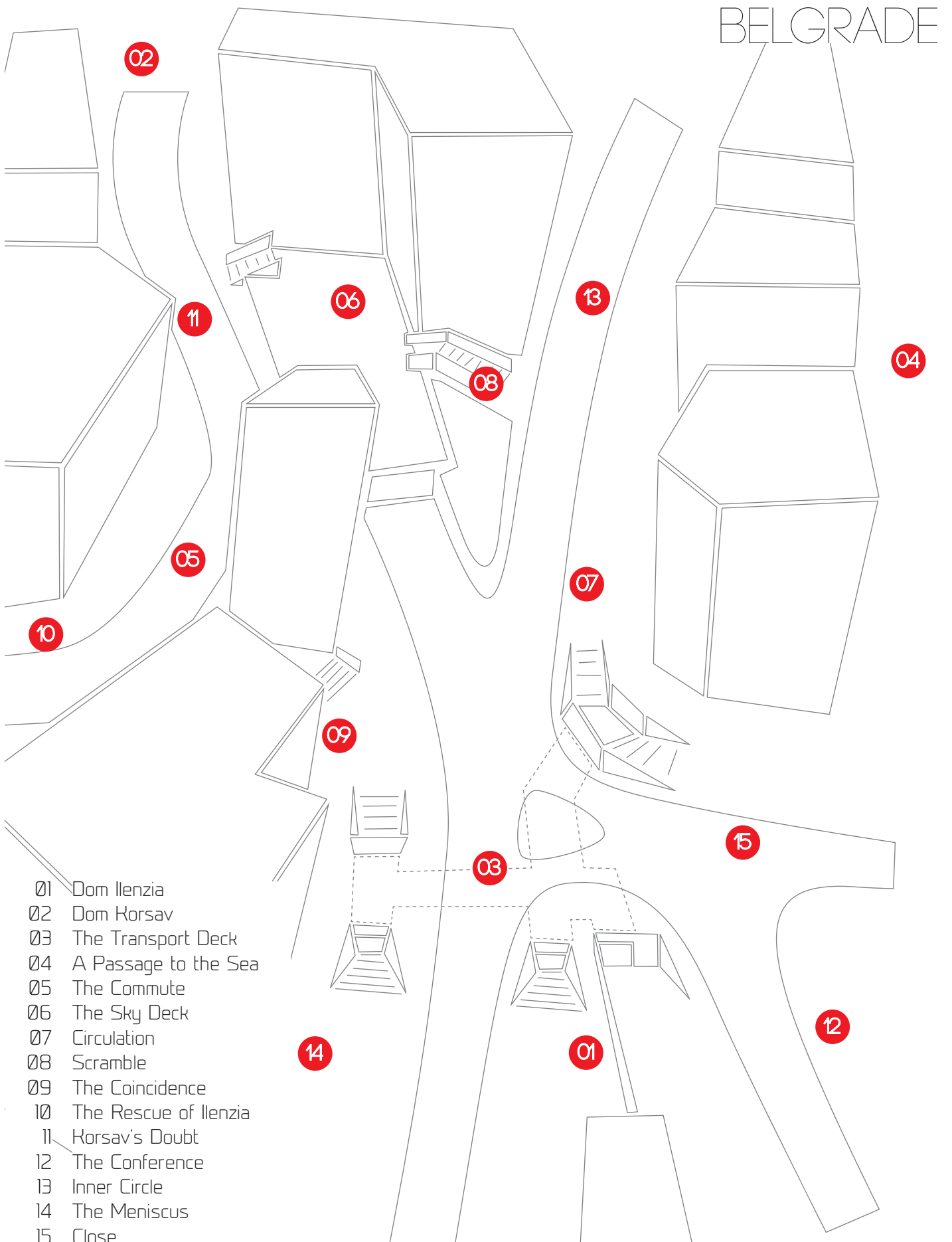
Marshall Biryuzov Street, Belgrade and Commuter Interchange 550, Nordizk experienced simultaneously

THE MAPPING STRATEGY

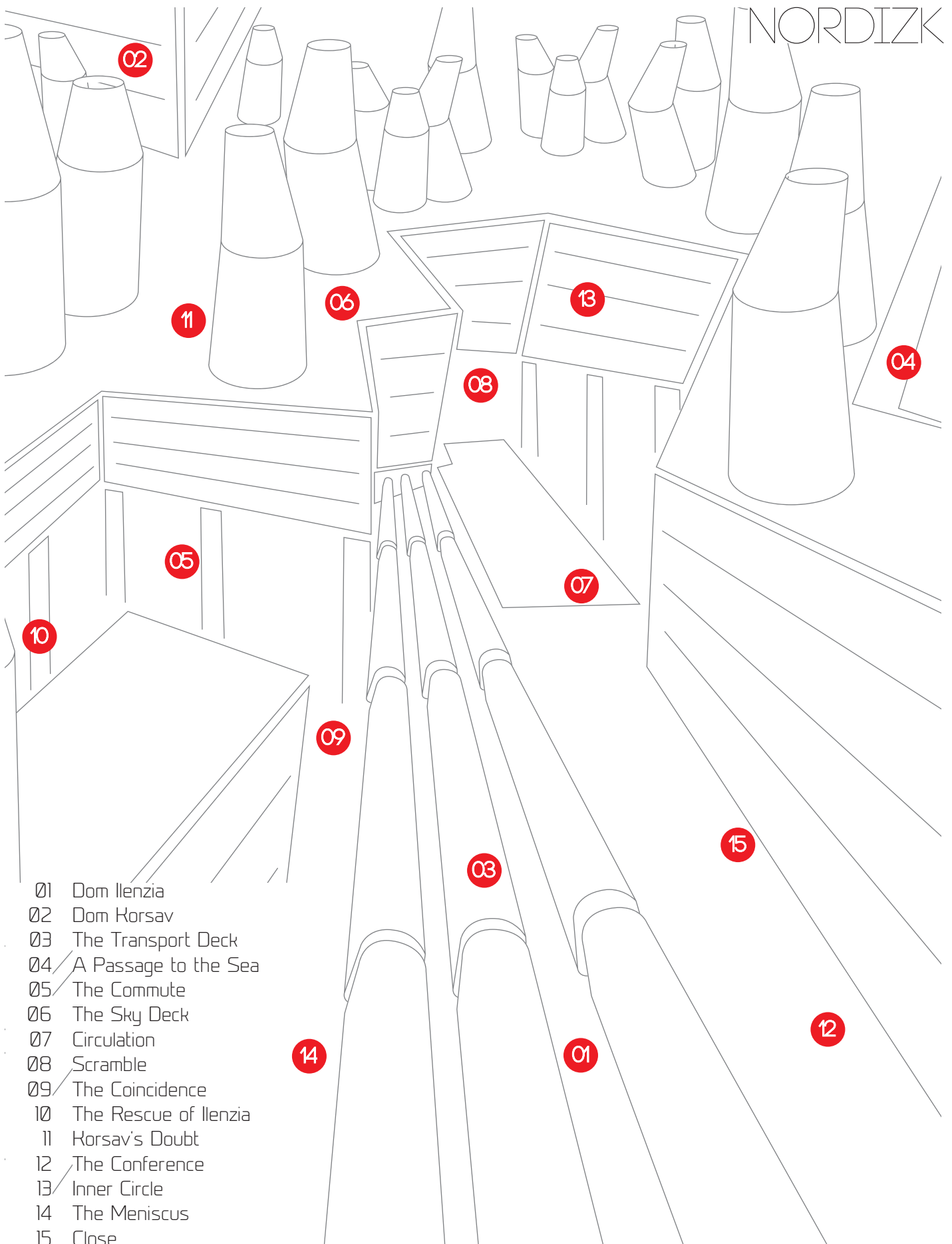
Points within the city are selected based on phenomenological similarities they share with their fictional counterparts.

Through location-specific media, the identity of a fictional space is mapped onto the existing space.

BELGRADE

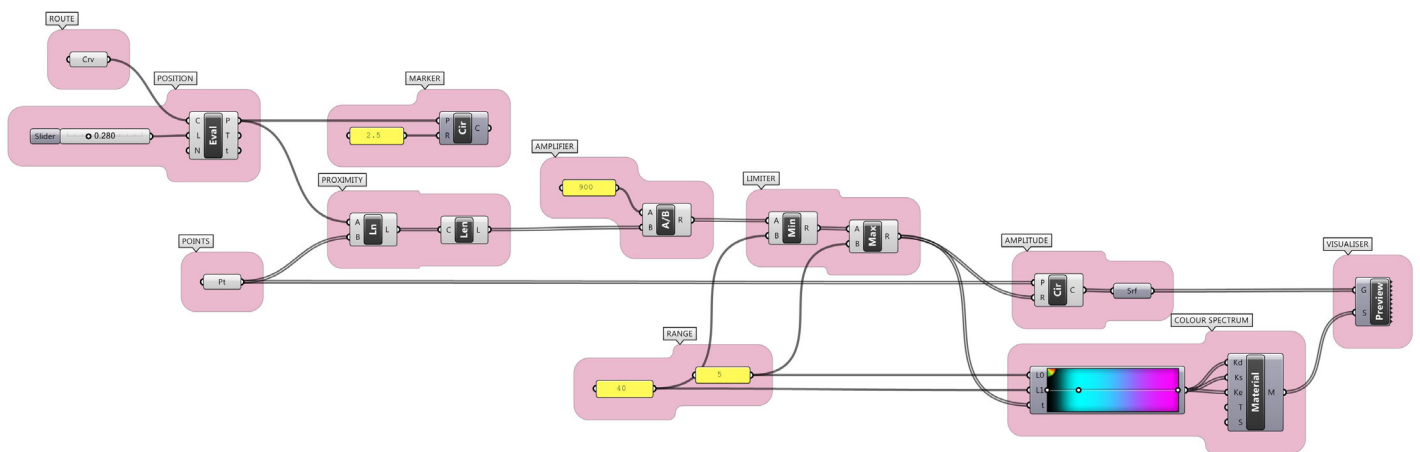


- 01 Dom Ilenzia
- 02 Dom Korsav
- 03 The Transport Deck
- 04 A Passage to the Sea
- 05 The Commute
- 06 The Sky Deck
- 07 Circulation
- 08 Scramble
- 09 The Coincidence
- 10 The Rescue of Ilenzia
- 11 Korsav's Doubt
- 12 The Conference
- 13 Inner Circle
- 14 The Meniscus
- 15 Close



- 01 Dom Ilenzia
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- 14 The Meniscus
- 15 Close

VISUAL SIMULATION



In order to communicate the concept of the user experience in visual format, I modelled the volume/distance parameters in Grasshopper, a parametric modelling software.

The size and colour of the points where sound is located represent the volume intensity and correspond to the proximity of the user.

The resulting animation is used in combination with video footage of the route that is simulated.

Images from the fictional city of Nordizk are superimposed over the footage to visually demonstrate how the different scenes should enter into acoustic space.



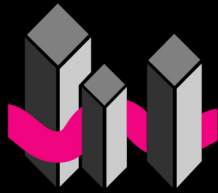
Points in Belgrade



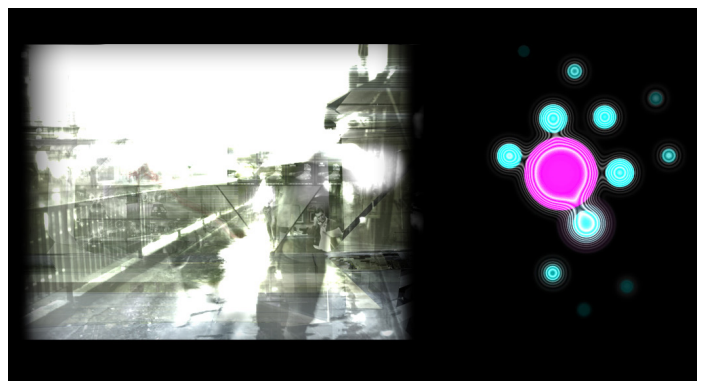
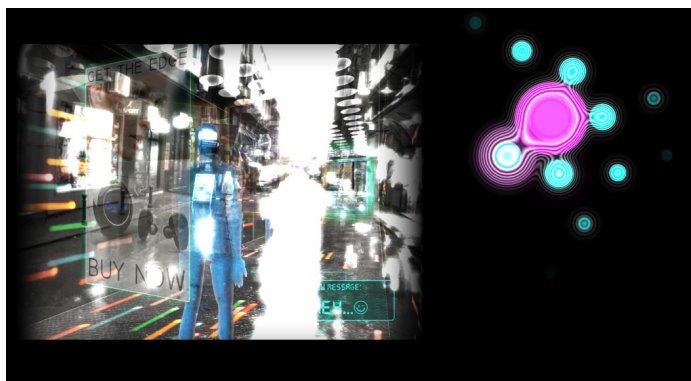
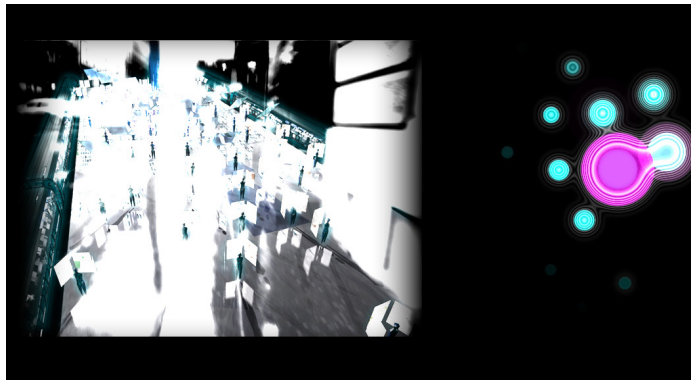
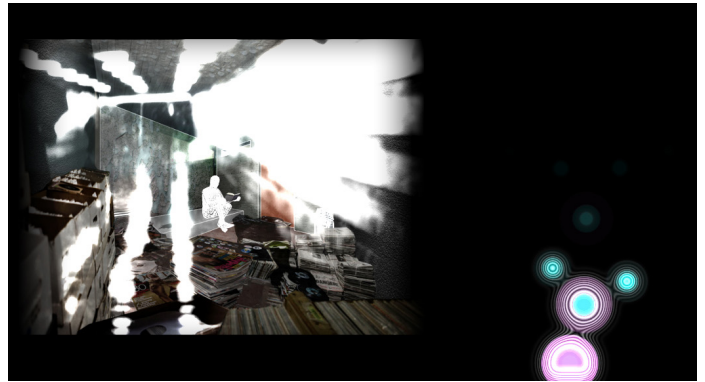
Parametric Model

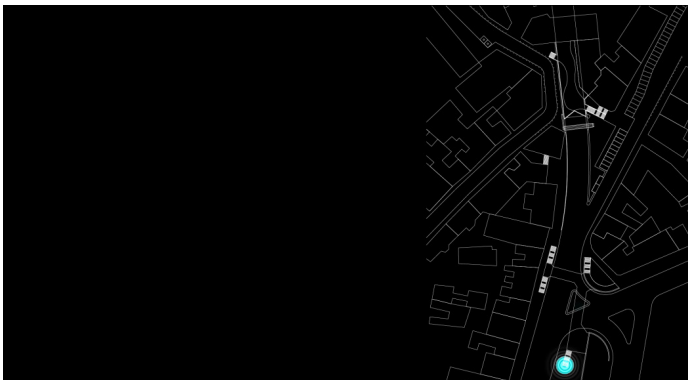
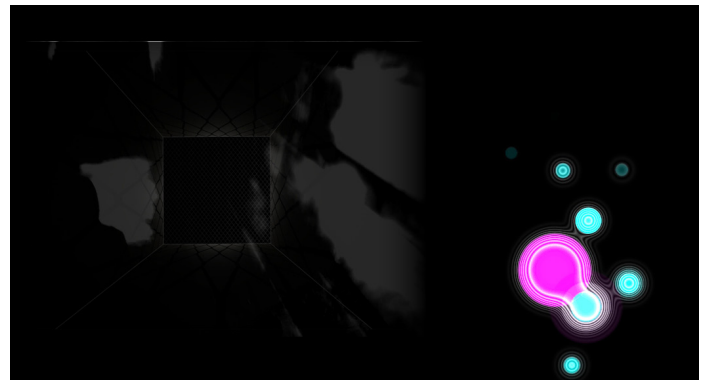
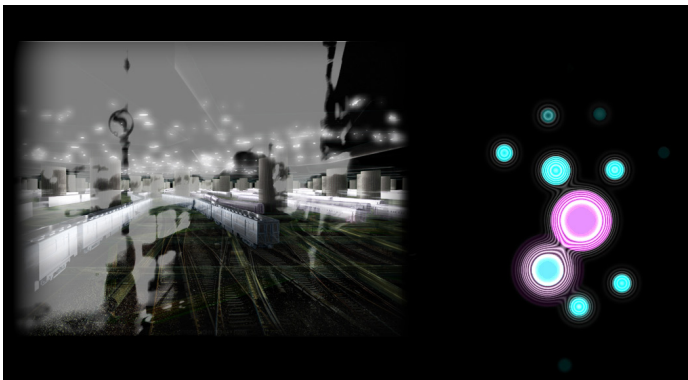
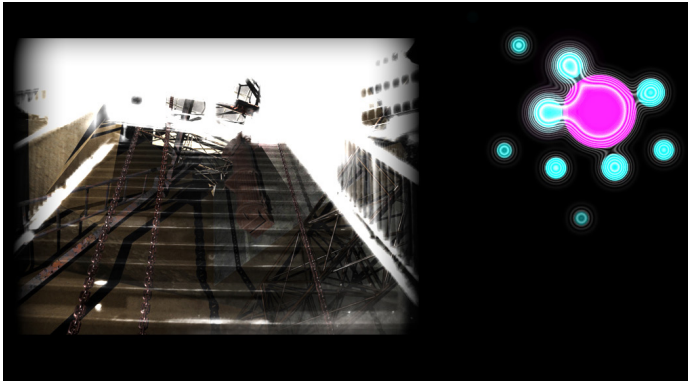
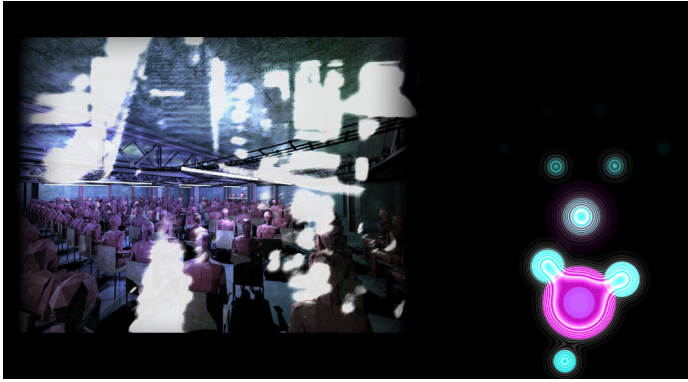
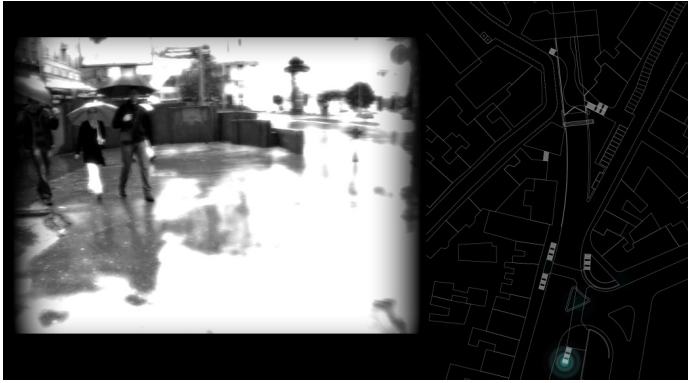


Rendered Animation



THE SUPERIMPOSITION OF ENVIRONMENTAL
NARRATIVES VIA THE SIMULTANEITY OF
ACOUSTIC SPACE





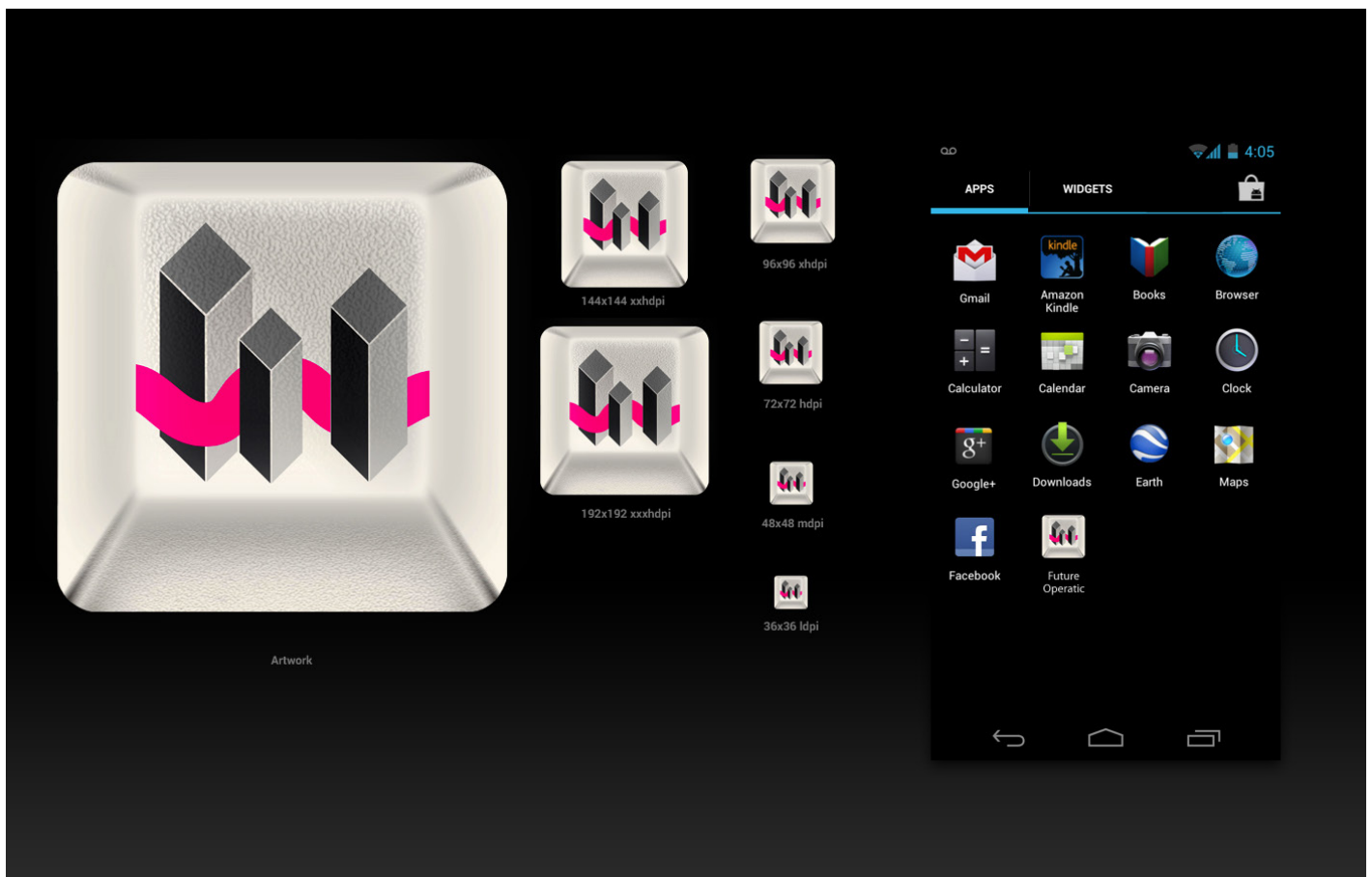
FILM
MUSIC
GRAPHICS
ANIMATION
BRIAN HOY

10. WHAT CIVIC FACILITIES ARE PROVIDED?

VERSION 1.0 INTERFACE CONCEPT

LOGO
MODE SELECTION
PROJECT SELECTION
MEDIA PLAYER OPTIONS

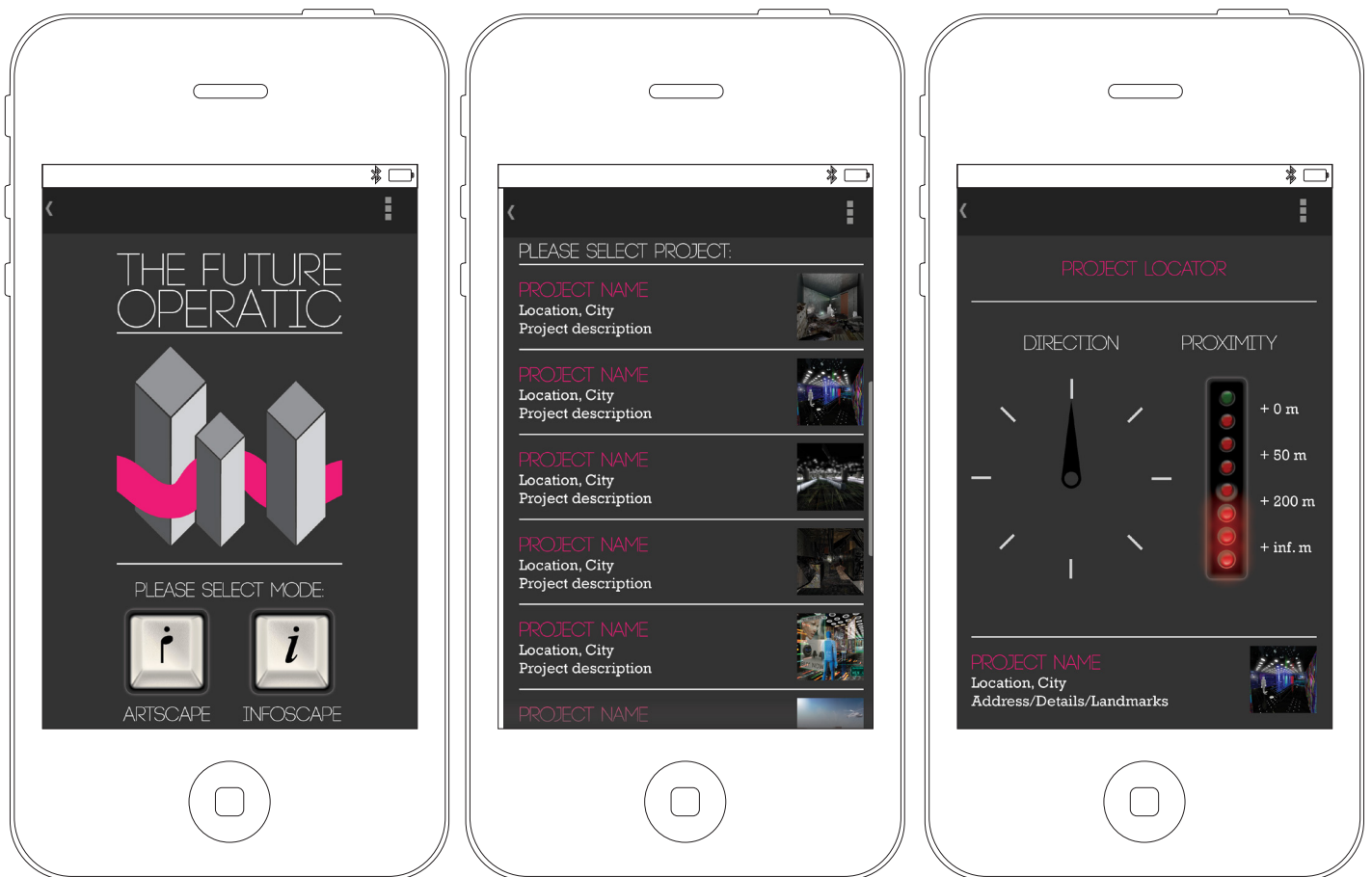
BUTTON & LOGO DESIGN



The Logo of the Future Operatic is based around the idea of sound waves travelling through the city. It clearly communicates the fundamental concept behind the application.

The button design of the Future Operatic is inspired by the aesthetic of early computer keyboards. It is a rhetorical simile of the archaic predecessor of its namesake.

BASIC FUNCTION

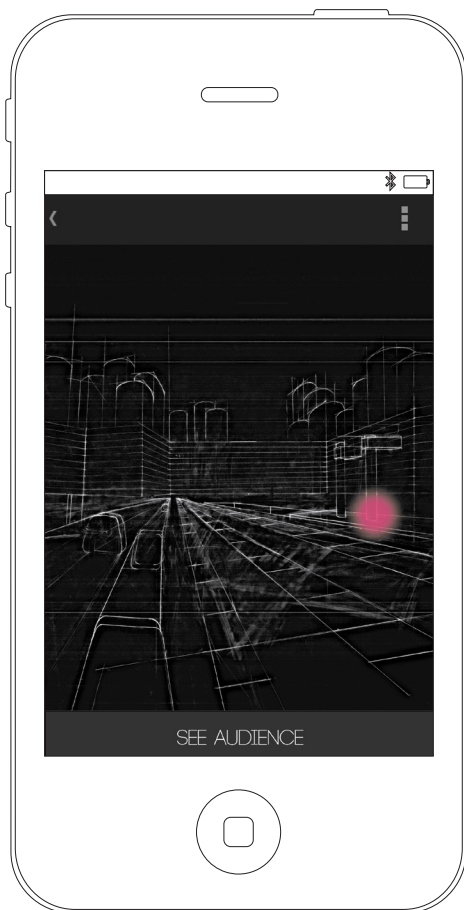


The splash screen gives the user the option to choose either artscape mode, where they will experience an artistic composition of sound and images, or infoscape mode, where they will access information about their physical environment.

The project library allows the user to view a selection of projects and load the project appropriate to their location. A description of the location is visible to ensure an appropriate project is selected.

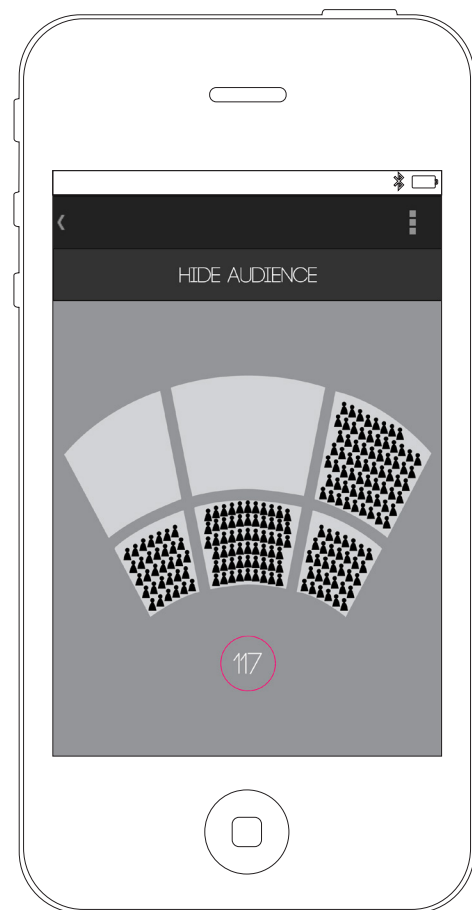
The project locator verifies that the user is within range of the project. It indicates proximity and whereabouts of the project, displaying a green light when the device is within range and the experience can begin.

ARTSCAPE MODE: DRAMATIC EXPERIENCE



Once inside artscape mode, the device displays an artwork which acts as a visual supplement for the composition they are experiencing.

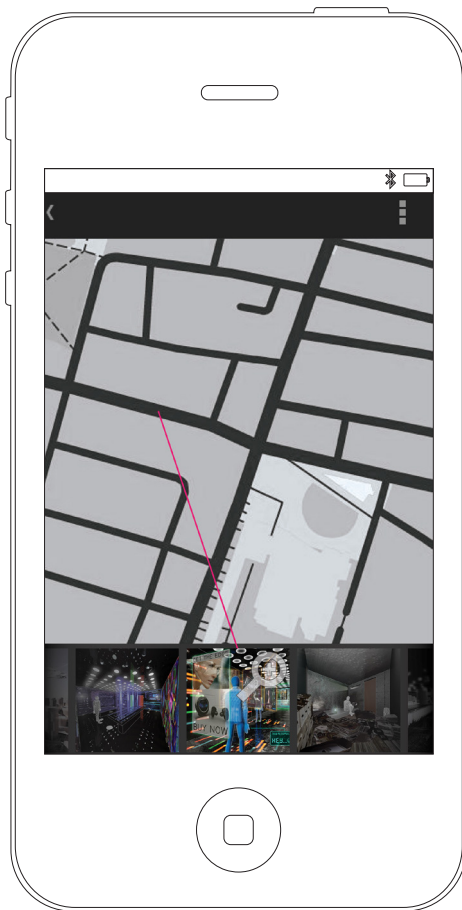
The image is illuminated in synergy with the music that is triggered via GPS.



To address the social aspect of the Future Operatic as digital a venue for the arts, members of the audience must be aware of each other. The number of active users is displayed in graphic format.

The audience can be shown or hidden without affecting the playback of audio.

INFOCAPE MODE: TOURISTIC EXPERIENCE



In infoscape mode, the artwork is representative of the existing city topography, orientated towards navigation. Both textual and visual information is connected to points on the map.

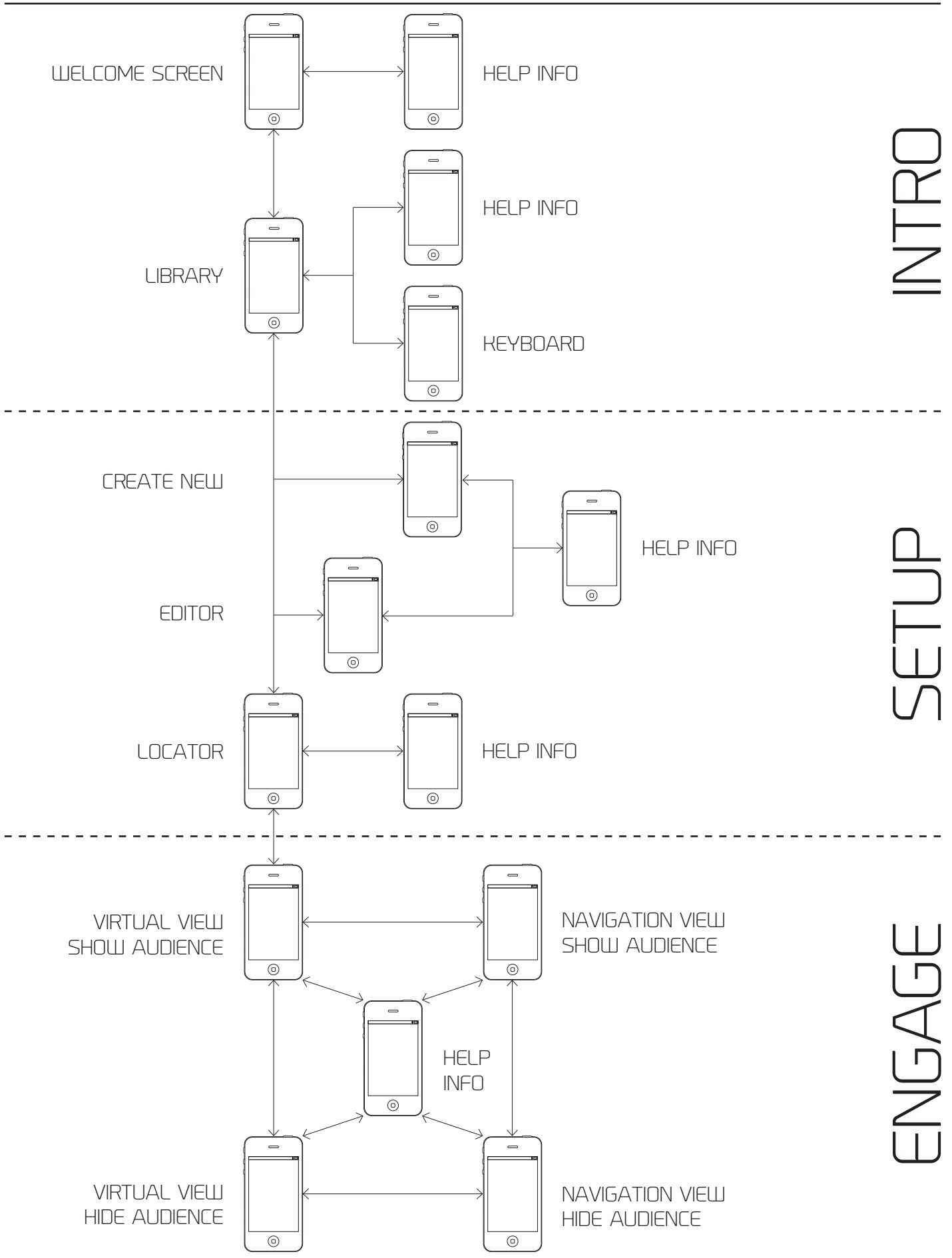
The visual information points displayed in synchronisation with the audio information that is triggered via GPS.



The supplementary images can be enlarged and a more detailed description can be viewed in text format.

VERSION 2.0 DESIGN DEVELOPMENT

USER GUIDANCE
USER JOURNEY
PROJECT EDITOR
CONTROL PANEL



The main developments in version 2.0 are:

- Information screens containing instructions for use at every stage throughout the user journey
- Project editor allowing people to manipulate projects and upload their own compositions

The addition of the project editor is significant because it changes the nature of the app from a product to a tool.

The idea that people can create their own environment is part of the Future Operatic philosophy.



The welcome screen communicates the concept via the logo and the information button to access further details.

The first information screen introduces the user to the app in very broad terms, designed to capture the imagination rather than describe a list of ingredients.



The project list screen shows users a list of all available projects, currently on the device's local disk.

As has become standard for interfaces, users can search either by scrolling or searching. When the user taps the text entry field above the list, a keyboard appears.

Instructions from this point are broken down very specifically, referring only to the functions of one screen in clear and simple terms.



If the user chooses to edit an existing project, they will arrive at a screen with all relevant fields already containing data, which they can then manipulate.

If the user chooses to create a new project, they will arrive at a screen with empty fields ready to custom build a soundscape from scratch.

The information screen gives step by step instruction on how to enter the data, and is also useful as a checklist.

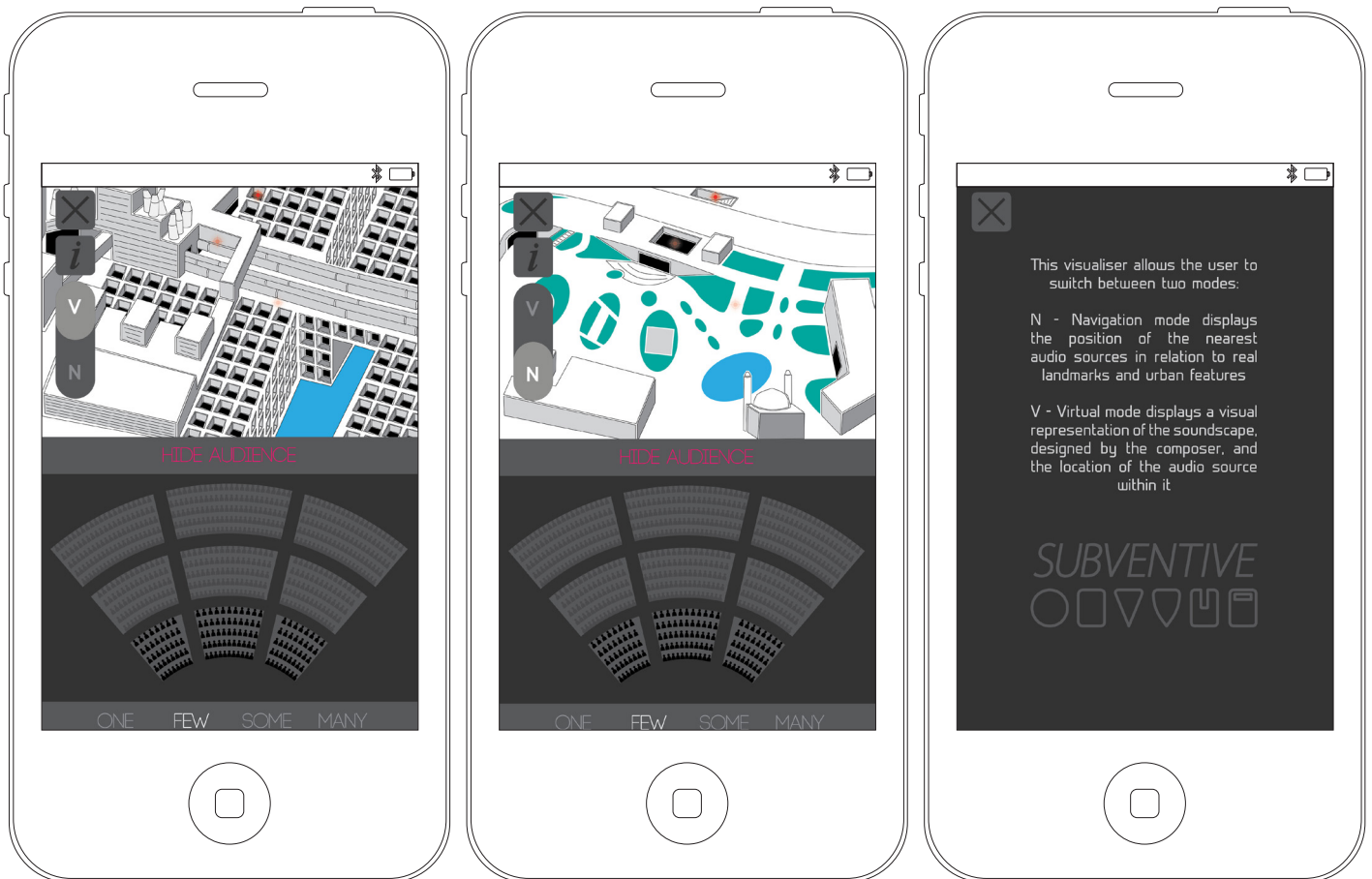


The locator screen displays the approximate distance to the project location and the direction that the user needs to travel in order for the experience to begin.

When the green light is illuminated the user knows that they are in the zone containing the points where sounds are located.

Once the green light on the locator has been illuminated the project will start to run automatically.

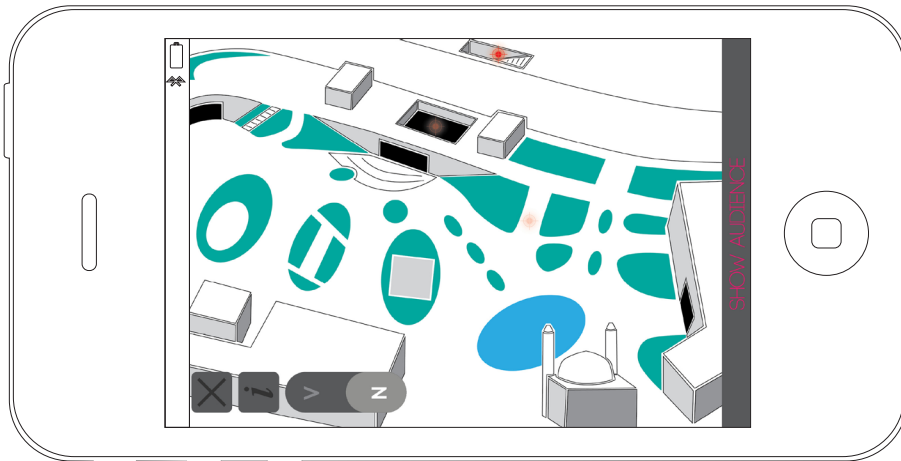
If the user does not decipher the projector locator immediately, instructions for its use are available on the associated information screen.



The default view is set to show the audience size. This is an important feature to simulate the social aspect of the opera house by making the audience aware of other members.

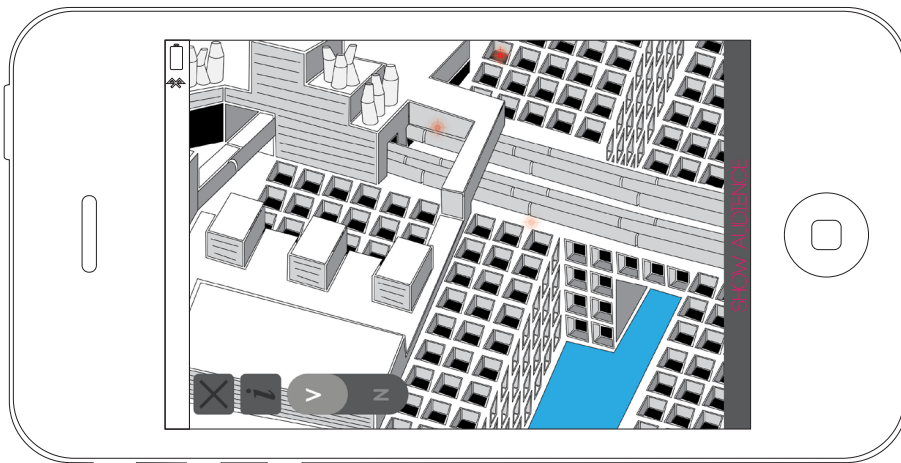
Using the V/N switch, the user can alternate between two landscapes, one representative of the real urban space, for navigation purposes, and one representative of the virtual space which corresponds to the soundscape.

The instructions break the meaning of the V/N switch down for the user.



To get a better view of the image, the audience feature can be hidden and the device turned into landscape.

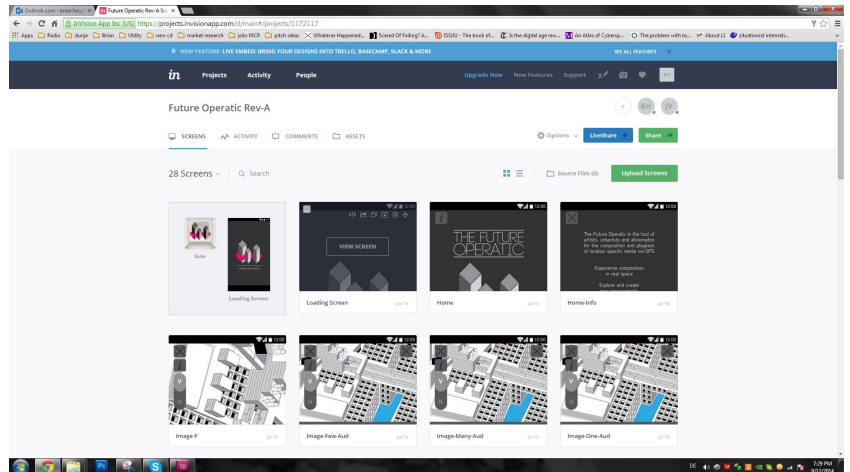
Red spots marking the position of the sounds fade in and out as the volume fluctuates according to the user location.



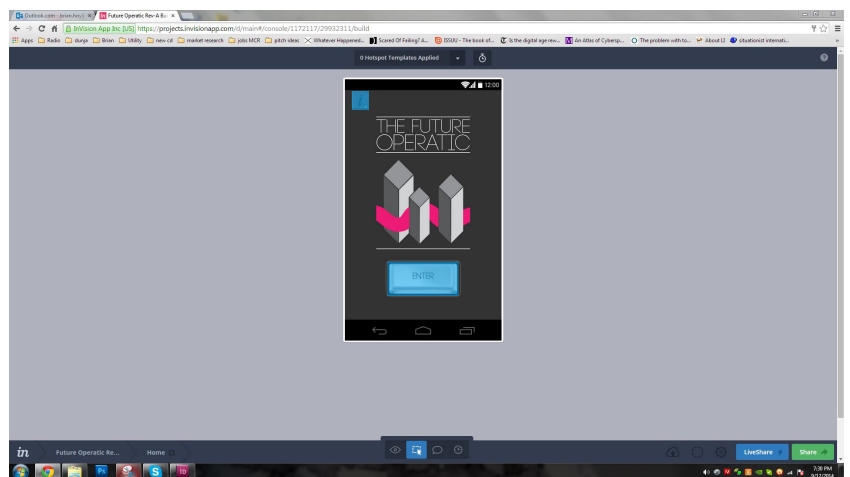
From these markers, the user can see the location of sounds currently playing and the location of nearby points, allowing them to choose their next destination and build their own unique sound journey.

WORKING PROTOTYPE

Using the invision prototyping tool, screen designs can be uploaded and shared between members of a project.



Active buttons can be added to each screen to create a mock up of the user journey.




```

if(distance <= 7)
{
    sound_volume(i, 1.0, 'primary');
}
/*...*/
else if(distance >= 14 && sound_volumes['primary'][i] != 0.0)
{
    sound_volume(i, 0.0, 'primary');
}
}

//...
if(!sound_increment['ambient'][i])
{
    if(distance <= 15 && distance > 7)
    {
        sound_volume(i, 1.0, 'ambient');
    }
    else if(distance <= 25 && distance > 7)
    {
        sound_volume(i, 0.5, 'ambient');
    }
    else if((distance <= 7 || distance > 32) && sound_volumes['ambient'][i] != 0.0)
    {
        sound_volume(i, 0.0, 'ambient');
    }
}
}

```

After communicating the concept to the programmers, we agreed on a very basic prototype to include:

- The playing of a sound at a volume dictated by user's proximity to a point location
- This function of volume to occur for multiple sounds simultaneously
- These multiple sounds to be synchronised (assuming all sounds have identical duration and timing)

The cost of this very basic prototype was €700.

Further development of the full graphic interface and any additional features form part of a separate work package that is to be undertaken subject to the success of the prototype and subject to finding investment.

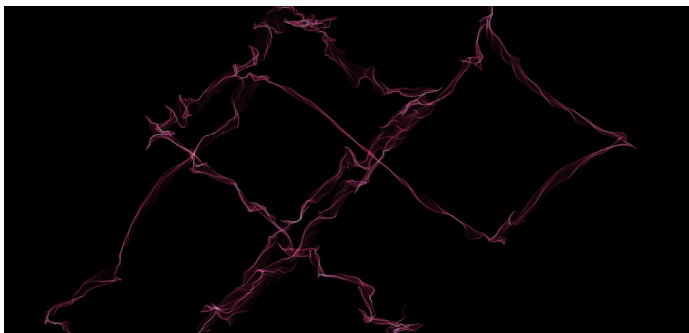
In order to attract investment, simulations of commercial uses must be drawn up to present to potential clients.

GENERATIVE IMAGE



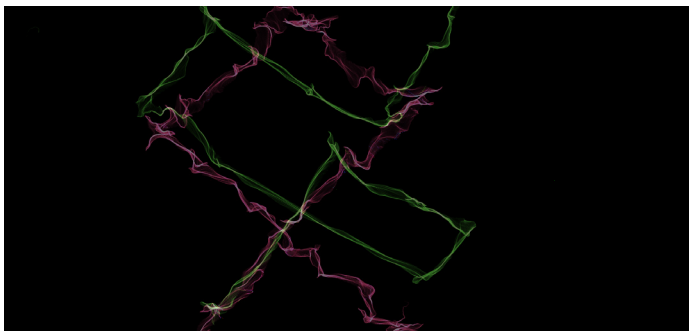
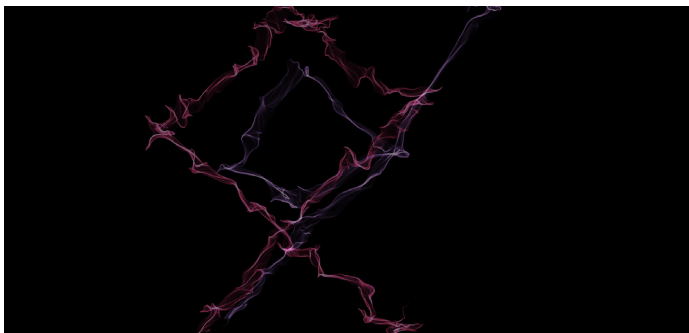
The conventional opera house has a visual presence in the city. It creates a representative image of itself that invites people to come to experience its content and once that content has been experienced the image acts as a memory - a place where something happened.

One feature that could be integrated into further development of the app is a generative image tracking the users' behaviour over time.



The point of such a feature is to accumulate a representative image of the digital venue.

Hosted on a website, the image would grow over time based on the usage of the digital venue, inviting people to contribute their own behaviour to the image and displaying visual traces triggering memories of popular performances.



source ³



11. WHAT EMERGES FROM THE PROJECT?

TRANSLATING ACADEMIA INTO PRACTICE

In order to address the relationship between academia and practice, I would like to use a universal theory, rather than an architectural one, namely Sanford Kwinter's Theory of Ecological Thinking ¹, which refers to Alexander von Humboldt's statement:

"Alles ist Wechselwirkung" ²

(everything is interaction)

The idea that different temporalities and different rates of unfolding exist in one matrix and are all universally connected through a web of potential differences is a useful way to understand the exchange that takes place between the two spheres of academia and practice, both part of a larger ecology called society.

Just as in an electrical circuit, a potential difference across a component causes a current to flow through it, if one wishes to catalyse the interaction between academia and practice, one must juxtapose them against one another.

To explore the potential of the Future Operatic, it must be turned over to the real world as a commercial product.

SUBVENTIVE



Subventive is a design studio working on ideas that make a difference. The studio is based in Belgrade, Serbia, with collaborators in various disciplines located in Austria, Germany, Serbia and the UK. Our studio's key strength is our understanding of urban processes, combined with our multidisciplinary skillset.

SERVICES

ARCHITECTURAL DESIGN
VISUALISATION
URBAN PLANNING
SOUND DESIGN
FILM PRODUCTION
APP DEVELOPMENT
GRAPHIC DESIGN
WEB DESIGN

DIRECTORS



Dunja Predic studied at The Belgrade Faculty of Architecture, Serbia, where she also taught, and The Staedelschule, Frankfurt, Germany, specialising in Critical Spatial Practice under Markus Miessen & Ben Van Berkel.

She designed and coordinated Yann Arthus Bertrand's 'The World from Above' exhibition and has collaborated with various forward thinking studios such as Raumlabor, Exyzt and Sinestezia, giving her a cutting edge approach to architecture and its cultural significance.



Brian Hoy studied at The Bartlett School of Architecture, University College London and the Technical University of Vienna, Austria focusing on digital urbanism under Prof. Will Alsop OBE. Over the last decade he has worked in the

well established offices of Alsop Architects, Schneider & Schumacher, Arca Architects and Michael Jones Architects, on a diverse range of projects, helping shape his informed understanding of architectural practice and the built environment.

PHILOSOPHY

Anticipating the demands that the future is bringing; Subventive focuses on developing realistic urban strategies, offering design services and research-based consultation as well as strategic management, from building design to digital media production.

For us, economic viability is just one single prerequisite in a vast array of values embedded in the built environment. Through socio-economic, historical and demographic research, we generate sensitive, effective proposals, aiming to support local economies, their work markets and culture.

The pursuit of excellence in design serves only as an idealistic starting point to address issues of greater complexity. We define projects as successful if they satisfy the budget, the demands of the client, the requirements of the users and if they perform well over time.

Subventive undertakes design services in-house, extending its capabilities and expertise when necessary through collaborations and partnerships. Our multidisciplinary team is well equipped to engage in interdisciplinary challenges. We always look forward to working together with owners, users, builders, developers and academics in order to mediate between different stakeholders and find the often unexpected, but always the best possible solutions.

PROJECTS



CUSTOM VIRTUAL SPACE, INTERACTIVE AV INSTALLATION 2013

A virtual space in which one controls acoustically modelled spatial characteristics using a physical interface. The user has the control over the position of the narrator within the space (left-right and near/far), the size of the space (large/small), the materiality of the space (soft/hard), the population of the space (empty/crowded), its context (urban/rural) and the permeability of its envelope (windows open/windows closed).



ONLINE CLASSROOM 2012

An experiment to test scenarios for online learning. We constructed three compartments using a modular wall system constructed from recycled packaging materials. In the first compartment was a live lecture. The lecture was then broadcast wireless to a second compartment where students watched in a remote group without a teacher. A 'student's eye view' from the second group compartment was then broadcast wireless to a third compartment containing one single isolated student.



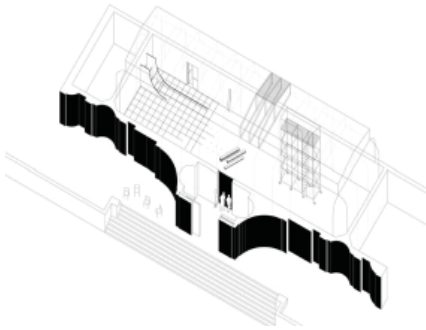
'NORDIZK', NOVELLA & MULTIMEDIA COMPOSITION 2014

Nordizk is a piece of science fiction exploring augmented urbanism. The scenography was developed as a sequence of 3D images taking the viewer through different parts of the city. Accompanying the visual scenography was an original musical score combining contemporary electronic music genres. The Nordizk story addresses the ethics of hyper-connectivity and the project points the way to a new form of urban music drama.



SPATIAL MATINÉE VIENNA, ART INSTALLATION 2013

We collaborated with artist Paran Pour to create an installation in Das Weisse Haus, an important Viennese institution for the promotion and presentation of young artists. The gallery has a special type of contract which allows it to occupy various spaces around the city according to their availability. It was this special contract which drew our attention and allowed us to create a site specific white-out, directing the audience away from the visual and towards the haptic.



SERBIAN PAVILION AT VENICE BIENNALE, SECOND PRIZE 2012

The pavilion was positioned on the border of the Giardini where the controlled exhibition area meets the rest of the city of Venice. We used this unique boundary condition to address the theme of borders and common ground: The doors on the exhibition side were glazed to allow visual contact whilst blocking physical access. The life of the city entered the pavilion through doors on the opposite side of the building.



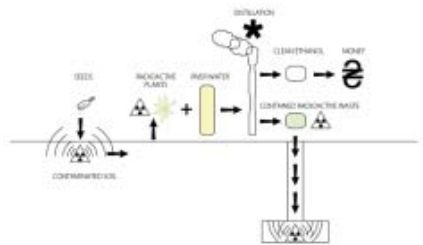
SINGLE FAMILY RESIDENCE, BELGRADE

The first thing on the site was the orchard - around 100 trees (plums, apricots, apples...), so the main intention was to design a house that would serve as a device to enjoy orchard even more. It performs as a shelter from the sun, rain, wind and snow, but at the same time it allows dissolving of existing borders while interchanging outside and inside.



OCCUPY FRANKFURT, URBAN CASE STUDY 2011

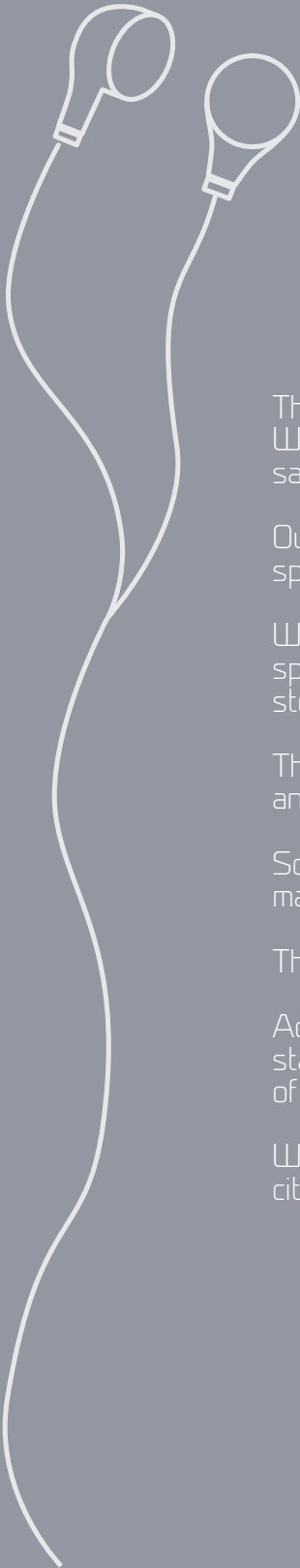
In the park in front of the European Central Bank, in the middle of the largest financial centre of continental Europe, sat the Occupy camp. The camp was shaped by different levels of activities informing each other through a shared spatial overlap. We investigated these layers of information contained within the the ground condition and how such information can be used productively in order to both organize and generate an arena for political dialogue.



BIOFUEL FOR NUCLEAR REFUGEES, SHELL IDEAS COMP. 2013

The proposal aims to repatriate nuclear refugees to their home soil by establishing a new industry which simultaneously decontaminates the soil and sustains the population, using phytoremediation to extract radioactivity. The plant material is then converted into a biofuel, which can be used in most of the cars on the road today. This directly addresses the most dangerous consequence of a nuclear disaster - poverty.

LOCATION SPECIFIC SOUND & VISION



The future of urbanism will be heavily dependent on mobile apps. Whether it be for public consultation processes or locating the nearest sandwich, the way we interact with our environment is changing.

Our experience of urban spaces will be increasingly enhanced by location specific digital media.

We have already tested a prototype which creates a virtual acoustic space where users can walk between the different scenes of a musical story, creating their own unique composition as they go.

This tool allows us to transform a part of the city into a music theatre and even to create compositions at a regional scale.

So far, we have been mixing sound using geolocation, but there are many more features to be developed.

The project is called The Future Operatic.

According to relevant data, location specific music is a good place to start due the extreme popularity of music production software, indicative of people's desire to create and publish their own compositions.

What better way to publish your media than to put it out there in the city?

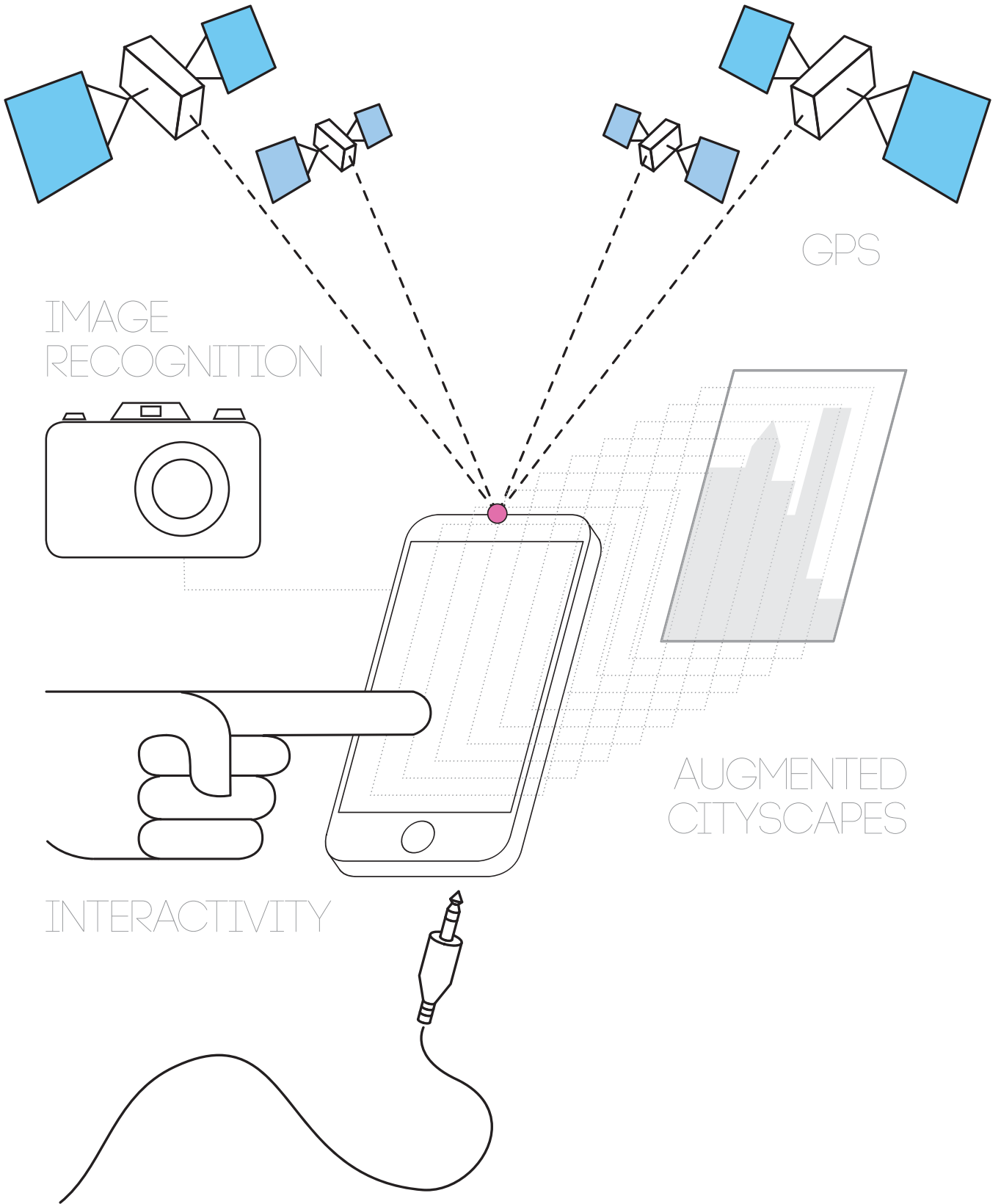


IMAGE
RECOGNITION

GPS

AUGMENTED
CITYSCAPES

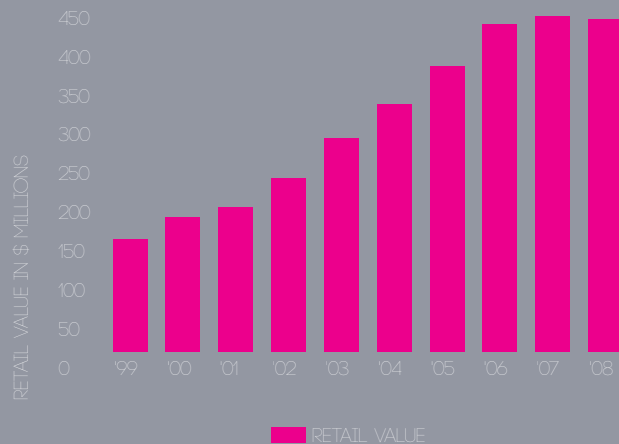
INTERACTIVITY

DIGITAL AUDIO WORKSTATION USAGE

45.7 PERCENT OF PEOPLE CONSIDER THEMSELVES TO BE MUSICAL.

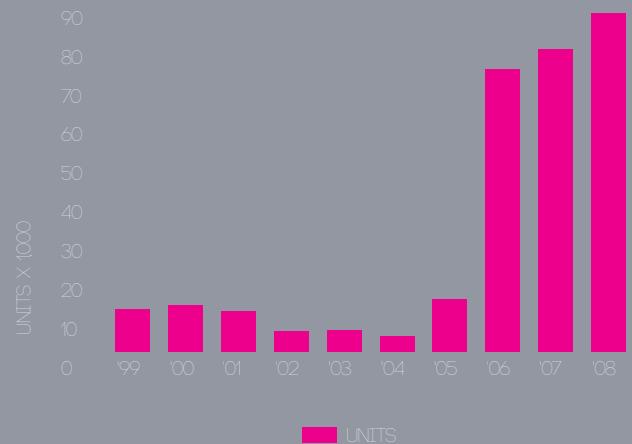
Source: SOMM, GfK Panel Services 2012

TOTAL COMPUTER MUSIC MARKET



	RETAIL
2008 SUMMARY	-0.93 %
10 YEAR TREND	198.71 %

CONTROLLER KEYBOARDS



	UNIT
2008 SUMMARY	1139 %
10 YEAR TREND	65601 %

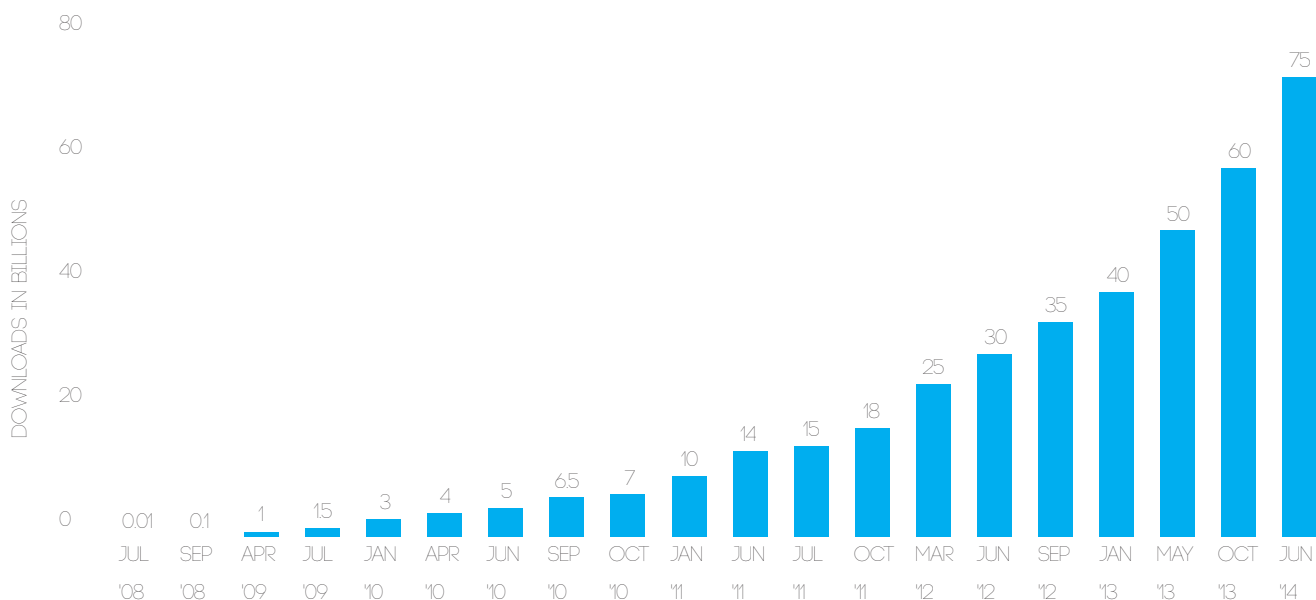
Source: NAMM Global Report

FROM 2005 TO 2010, ABLETON AG WAS ABLE TO TALLY A GROWTH RATE OF OVER 185 PERCENT

Source: Deloitte Technology Fast 50

SMARTPHONE APPLICATION USAGE

CUMULATIVE NUMBER OF APPS DOWNLOADED FROM APP STORE

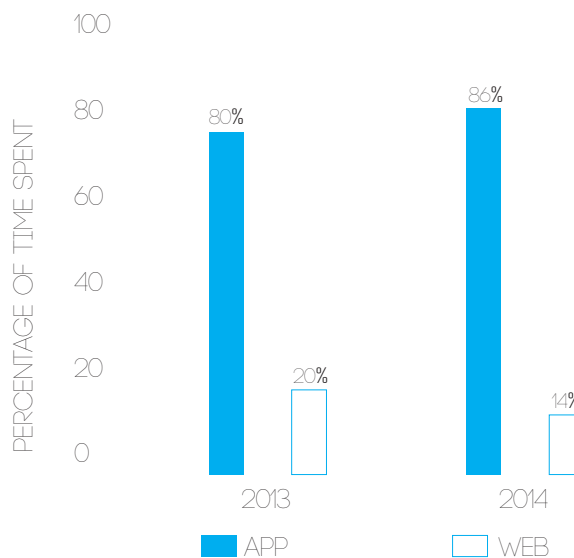


Source: Statista 2014

POTENTIAL ECONOMIC IMPACT OF MOBILE INTERNET APPLICATIONS IN 2025 OF 3.7 TO 10.8 TRILLION DOLLARS

Source: Mckinsey Global Institute

PERCENTAGE OF TIME SPENT ON MOBILE WEB VS APPS ON CONNECTED DEVICES



Source: Statista 2014

THE FUTURE OPERATIC PROJECT



The Future Operatic is a project run by the Subventive Design Studio which aims to pioneer a new wave of art and music performance technology in order to arrive at a new modus operandi for urban information services.

It starts by weaving together the city and the cyber through stories and music in order to prototype a platform which can then be adapted for businesses and urbanites - professional and consumer - to deliver and access information efficiently to and from points within a city without the need to install conventional in situ infrastructure, enhancing connectivity for all sectors of a community.

Essentially, the app plays media from wearable technology via GPS that is specific to the user's location, in a way that enhances and in some cases substitutes conventional signage or architecture. Unlike conventionally broadcast media, we can design audio visual experiences space by space.

This possibility to add new layers and landscapes to existing environments presents firstly an opportunity for new forms of art and ultimately new forms of urban communication to emerge.

A venue can be created where no building exists. Information can be delivered where no signpost exists.

Commercialisation of the project will mean that it's application will be global. Subventive contacts in various countries will facilitate this in the early stages.

The question is where the next stage of the project should be developed...

URBAN OPERAS
BRANDED SPACES
HERITAGE GUIDES
PUBLIC SOUNDSCAPES
DIGITAL FESTIVALS
EVENT GUIDES
LOCALISED INFO SERVICES
EXHIBITION NARRATION
ACCESSIBILITY
TRAVEL

WHAT NOW...

Subventive is looking to relocate the main office to an EU market. Cities under consideration include Frankfurt, London, Manchester and Vienna. The key criteria will be:

- Political stability
- Environment
- Culture
- Connectivity
- Opportunities for collaboration
- Access to skilled workforce
- Cost of operating
- Business support
- Financial support

The timescale is Autumn 2014, in order to progress the Future Operatic project.

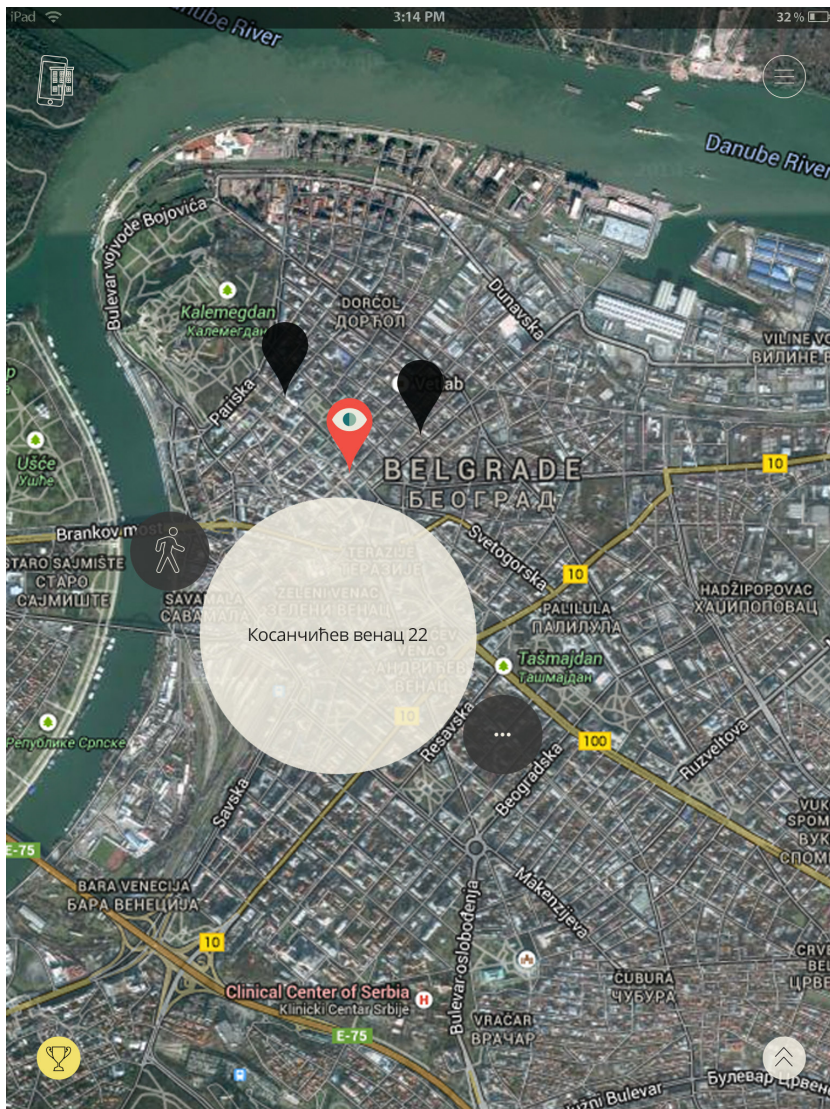
TheFutureOperatic



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studio@subventive.com

COLLABORATION WITH LIVE VIEW STUDIO

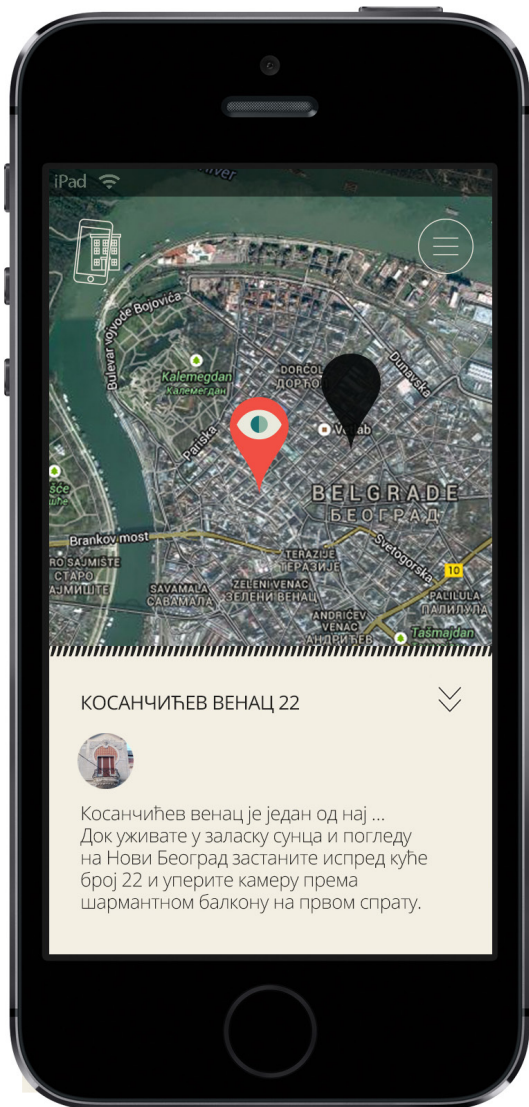


Treasure Hunt is part of an exhibition in the National Museum of Serbia to mark the centenary of the outbreak of the first world war. As the creative director of Studio Subventive, and on the back of the **Future Operatic** project, I was approached by LVS to provide the sound design for the application.

Treasure Hunt is a location based augmented reality application, where the user is guided to five points around the city. Each point represents in some way one aspect of life in Serbia at the time of the outbreak of the first world war - economy, politics, culture, science.

The locations are either historically important places, such as the present day catholic church headquarters, which was the Austrian embassy at the time and the place where the letter announcing the war was delivered. In other cases it is either the house where a significant figure lived or worked such as the national theatre.

When the user is at the correct location, they use their mobile phone to discover the historical figure as an augmented reality layer with additional text information. Once they trigger the augmented reality content, the location is 'unlocked' and they are guided to the next one. They can only click on the next location once the previous one is unlocked. When all five locations are unlocked the user receives a coupon for a gift in the museum.





1. The Opera

The murmur of an audience turns to quiet as the orchestra tune there instruments. Applause welcomes the composer Binicki to the conductor's stand and his famous piece 'Na uranku' fills the national theatre.



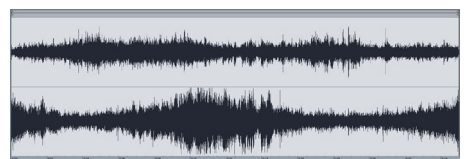
2. The Street

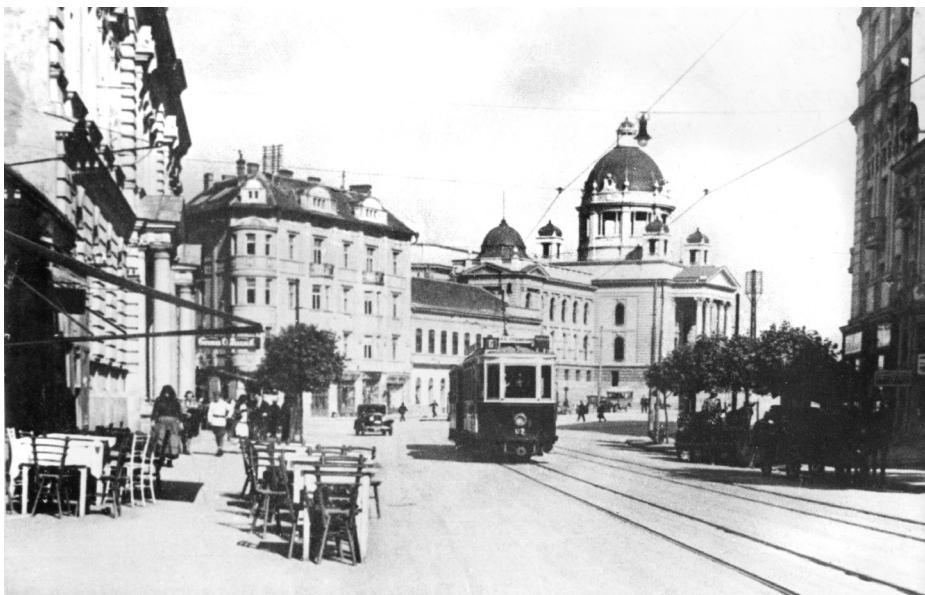
A busy street scene containing the sound of historic motor cars, horse drawn carts delivering goods and historic tram sounds as people move around the city during Laza Pacu's days as Serbia's minister for economics.



3. The Market

The fish market close to the harbour where Mika Alas sold his wares near his house at Kosancicev venac, and Zlatna Moruna, a place where members of the Bosnian Youth used to meet.





4. The Kafana

A busy Serbian Kafana where customers can be heard drinking coffee and talking during Djordje Vajfert's time as governor of the Bank of Serbia.



5a. The Drummer

Another street scene where a drummer announces the outbreak of war to the public soon after Prime Minister Nikola Pasic has received the news.



5b. The Embassy

As we enter Austro-Hungarian embassy we hear the doors closing and the street noises diminish, replaced by the sound of typewriters as office staff hammer out correspondence. Beyond the office floor, we hear a german speaking voice describing the Austro-Hungarian position on the war.



source ⁵



12. HOW WAS THE PERFORMANCE RECEIVED?



ESTHER, ARTIST, 29

If you had to describe the experience (not the technology) to someone from the 1870s, what would you say?

I would say: It's a big city spectacle performed by invisible artist.

If compositions of this kind were being released by different artists on a regular basis, would you subscribe to this service?

For the music that I love, definitely. I would be interested to hear a composition related to a specific part of the city, in one way or another. It was definitely exciting to walk down the streets which I walked for years and experience them in a completely new way. The spatial experience was different without any spatial changes, just because the layer of the sound completely changed the character of the place.

If there was an easy way to import your own compositions into the app, what kind of experience would you create?

I am completely in love with one old neighborhood in my home town, soon to be turned into typical capitalist office/apartments tower block. I think I would make something like sound map, which will soon become historical documentation capturing the moment when apple trees were still growing in gardens between houses and where the community would prepare marmalade together or build a shed. I would make some collage of dialogs and sounds. Also I think it would be interesting to put on some story happening in a particular city or part of the city.

If a composition was only available for one hour, do you think the release of a new composition could become a social event?

I think what I like most about the app is that there is no time when you have to show up. This is its biggest advantage. But I think that some restrictions could be good - the composition can be out there for few days or weeks. Maybe there is some special hour with a special program that only happens once. But the composition shouldn't be on just for one hour. Anyway I guess there are different situations where a different approach is needed. All I can say is that it seems to me that this app has a broad field of application.

Do you have any general comments, ideas or suggestions?

I would like to be able to see how many people around me are using the application. I think that for the young generation that is something social. While testing the app, I encountered other people who were also involved in the testing. It created a completely different relationship with them than with the other people who were in the same streets, because we shared another dimension together.



GERNOT, ENGINEER, 66

If you had to describe the experience (not the technology) to someone from the 1870s, what would you say?

Wow, even I don't get it, so I can't imagine how it would seem to them!!!!

If compositions of this kind were being released by different artists on a regular basis, would you subscribe to this service?

No, I am not used to following trends and new releases.

If there was an easy way to import your own compositions into the app, what kind of experience would you create?

I don't know, I guess I am not creative in this way.

If a composition was only available for one hour, do you think the release of a new composition could become a social event?

I believe it could.



MARTIN, LAWYER, 28

If you had to describe the experience (not the technology) to someone from the 1870s, what would you say?

If I would be asked to describe the experience I would say that it is a 'treasure hunt' tool to guide you through city and discover new sounds.

If compositions of this kind were being released by different artists on a regular basis, would you subscribe to this service?

I really liked the experience of sounds in different places!

If there was an easy way to import your own compositions into the app, what kind of experience would you create?

I would definitely send my own mix, if there was some kind of open call. I liked those Chinese bells near the cafe the most.

If a composition was only available for one hour, do you think the release of a new composition could become a social event?

I also like the idea of new releases every 1 hour, it would definitely make the application more social!

Do you have any general comments, ideas or suggestions?

It needs some fine-tuning design-wise, but the rest is great! I hope there will be an option in the future to zoom in on the graphics.



HELGA, ARCHITECT, 67

If you had to describe the experience (not the technology) to someone from the 1870s, what would you say?

The whole city turns into a stage.

If compositions of this kind were being released by different artists on a regular basis, would you subscribe to this service?

Absolutely, yes!

If there was an easy way to import your own compositions into the app, what kind of experience would you create?

Travel guides and education.

If a composition was only available for one hour, do you think the release of a new composition could become a social event?

Yes, both bigger and smaller, depending on context.

WHAT IS THE
CONCLUSION
OF THIS
PROJECT?

CONCLUSION

Through studying the cultural and technological context of the project, encountering difficulties during its development and evaluating it through testing and user feedback, I have illustrated the potential of the mobile application as digital venue for music theatre.

I have achieved my goal of exploring digital performance space to a certain extent, but there are many avenues yet to be pursued, such as live streaming, web hosting and localised hardware. What the project lacked in terms of financial capital to fully develop and market a commercial product, has been compensated for by developing a deeper understanding of the way we experience music and space.

During the course of the project, the spatial composition of sonic narratives has been proven to have both a commercial value as well as an artistic one.

It is not the case that a mobile app can act as a substitute for conventional architecture, but mobile technology can certainly change the way we use and perceive conventional space to such an extent that we must review conventional architectural types.

The opera house as an building typology may somehow have become culturally immortalised, but the opera-going, that is to say the world around it, is now ready to consume new art formats through new spatial mechanisms, spatial organisation, hierarchy and protocol.

My conclusion is that buildings and digital media should seek to inform one another in practice.

My question is whether or not a studio can exist commercially on this threshold, mediating between the two in order to produce a level of sophistication beyond the status quo.

BIBLIOGRAPHY & NOTES

1 - James Baldwin, *The Cross of Redemption: Uncollected Writings*, New York: Pantheon Books 2010

1. existing urban facilities

1 - Table data top to bottom:

- <http://www.chncpa.org> (Accessed 30.12.13, 13:42 CET)
- <http://www.metoperafamily.org> (Accessed 30.12.13, 13:42 CET)
- <http://www.teatrocolon.org.ar> (Accessed 30.12.13, 13:42 CET)
- <http://visitepalaisgarnier.fr> (Accessed 30.12.13, 13:42 CET)
- <http://www.chateauversailles-spectacles.fr/> (Accessed 30.12.13, 13:42 CET)
- <http://www.operadeparis.fr/l-opera-de-paris> (Accessed 30.12.13, 13:42 CET)
- <http://www.roh.org.uk/> (Accessed 30.12.13, 13:42 CET)
- <http://www.teatroallascala.org> (Accessed 30.12.13, 13:42 CET)
- <http://www.theaterdo.de> (Accessed 30.12.13, 13:42 CET)
- <http://www.sydneyoperahouse.com> (Accessed 30.12.13, 13:42 CET)
- <http://www.teatrosancarlo.it/> (Accessed 30.12.13, 13:42 CET)
- <http://www.wiener-staatsoper.at> (Accessed 30.12.13, 13:42 CET)
- <http://www.operaen.no/> (Accessed 30.12.13, 13:42 CET)
- <http://www.teatrolafenice.it> (Accessed 30.12.13, 13:42 CET)

- <http://www.stats.gov.cn/tjsj/ndsj/2013/indexeh.htm> (Accessed 30.12.13, 18:50 CET)
- <http://quickfacts.census.gov/qfd/states/36000.html> (Accessed 30.12.13, 18:50 CET)
- http://www.censo2010.indec.gov.ar/preliminares/cuadro_totalpais.asp (Accessed 30.12.13, 18:50 CET)
- http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/metropolitan_regions (Accessed 30.12.13, 18:50 CET)
- http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/metropolitan_regions (Accessed 30.12.13, 18:50 CET)
- http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/metropolitan_regions (Accessed 30.12.13, 18:50 CET)
- <http://www.london.gov.uk/mayor-assembly/mayor/publications/gla-intelligence/> (Accessed 30.12.13, 18:50 CET)
- [demography/population/ons-2013-mid-year-population-estimates](#) (Accessed 30.12.13, 18:50 CET)
- <http://www.demographia.com/db-worldua.pdf> (Accessed 30.12.13, 18:50 CET)
- http://www.dortmund.de/de/leben_in_dortmund/stadtportraet/statistik/bevoelkerung/index.html (Accessed 30.12.13, 18:50 CET)
- <http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2012-3~Main+Features~Main+Features> (Accessed 30.12.13, 18:50 CET)
- <http://www.demographia.com/db-worldua.pdf> (Accessed 30.12.13, 18:50 CET)
- http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/regional_statistics/data/database (Accessed 30.12.13, 18:50 CET)
- <http://www.ssb.no/a/kortnavn/folkendrkv/arkiv/tab-2011-02-24-02.html> (Accessed 30.12.13, 18:50 CET)
- <http://dati-censimentopopolazione.istat.it/> (Accessed 30.12.13, 18:50 CET)

- Iannace/Ianniello/Maffei/Romano. *Journal of Sound Vibration* v.232, 2000
- Rosand. *Opera in 17thC Venice*. Berkeley Press, 1991

2 - Niccolini Antonio, Cod. NC0883, http://www.pedicinimages.com/index_ing.html (Accessed 22.02.14, 18:50 CET)

3 - Flickr user Hui Lan, China (national theatre @ Flickr) [CC-BY-2.0 (<http://creativecommons.org/licenses/by/2.0>)], via Wikimedia Commons (Accessed 22.02.14, 18:50 CET)

2. developing urban conditions

- 1 - Mark de Jong, <http://tourdeville.nl/> (Accessed 23.05.14, 17:47 CET)
- 2 - Mark de Jong, <http://tourdeville.nl/> (Accessed 23.05.14, 17:47 CET)
- 3 - 'Was ich will, Die Zeit, Vienna, March 1901', Hans Curjel, Zum neuen Stil, University of Michigan, Piper, 1995
- 4 -, 'Nur keine Panik, Protokolle, Vienna, July 1971', Hermann Czech, Zur Abwechslung: ausgewählte Schriften zur Architektur Wien, Wien, Löcker, 1996
- 5 - <http://www.internetworldstats.com/emarketing.htm> (Accessed 23.05.14, 13:55 CET)
- 6 - International Telecommunication Union, Measuring the Information Society ISBN9789261144012, Geneva, 2013

3. interplay of space & digital technology

- 1 - David Allenby , Michel van der Aa: Interview about After Life, March 2006
http://www.boosey.com/pages/licensing/news/further_info.asp?site-lang=de&newsid=11206
(Accessed 09.05.14, 12:04 CET)
- 2 - Mike Hoban, <http://www.bbc.co.uk/programmes/galleries/p018gckh> (Accessed 09.05.14, 12:04 CET)
- 3 - Michel v.d.Aa, <http://soundintermedia.tumblr.com/#76320013526> (Accessed 09.05.14, 12:04 CET)
- 4 - Maane Khatchaturian, New tech helps L.A. performance troupes bring culture to the train station, November 2013
<http://variety.com/2013/legit/news/invisible-cities-immersive-opera-1200841486/> (Accessed 09.05.14, 12:04 CET)
- 5 - A. Jay Adler, <http://sadreearth.com/invisible-cities/> (Accessed 09.05.14, 12:04 CET)
- 6 - "Invisible Cities Opera - Adelma", Youtube user TeamTeamUSA, http://www.youtube.com/watch?v=4HJK_2O5JqA&list=PLR15qGP-nv__co9wdv47wMeWp99SFt8Pw&index=2 (Accessed 09.05.14, 12:04 CET)

4. building analysis

- 1 - Eduard v.d.Nüll & August v.Siccardsburg, K.K. Opernhaus in Wien, Allgemeine Bauzeitung, Wien, Waldheim, 1878
- 2 - Statsbygg, Nytt operahus Den Norske Opera & Ballett - Nybygg og brukerstyr, Ferdigmelding 673 August 2008, Oslo
- 3 - http://www.theworldopera.org/wordpress/?page_id=2 (Accessed 01.08.14, 11:05 CET)
- 4 - http://www.theworldopera.org/wordpress/?page_id=22 (Accessed 01.08.14, 11:05 CET)
- 5 - http://www.theworldopera.org/wordpress/?page_id=22 (Accessed 01.08.14, 11:05 CET)
- 6 - Jana Rodic, <http://www.digitalheritage2013.org/techcoltour/> (Accessed 01.08.14, 11:05 CET)
- 7 - Marko Todorovic, <http://centarzaurbanirazvoj.com/project-tech-tour/> (Accessed 01.08.14, 11:05 CET)
- 8 - Marko Todorovic, <http://centarzaurbanirazvoj.com/project-tech-tour/> (Accessed 01.08.14, 11:05 CET)

5. cultural analysis

- 1 - Hill. Oratory Music in Florence I: Recitar Cantando 1583-1655, Acta musicologica v.51, 1979, p108-136
 - 2 - Sonneck. Dafne, the First Opera. A Chronological Study - Sammelbände der Internationalen Musikgesellschaft. Franz Steiner Verlag, 1913, p102-110
 - 3 - Raynor. A Social History of Music: From the Middle Ages to Beethoven. Barrie & Jenkins, 1972, p171
 - 4 - Zelochow. The Opera: The Meeting of Popular and Elite Culture in the Nineteenth Century, History of European Ideas v.16, 1993, p262
 - 5 - Storey. Culture and Power in Cultural Studies: The Politics of Signification. Edinburgh University Press, 2010, p86-87
 - 6 - McConachie. New York Operagoing 1825-50: Creating an Elite Social Ritual. American Music v.6, University of Illinois Press, 1988, p182
 - 7 - Wolff. "The Ideology of Autonomous Art.", Music and Society: The Politics of Composition, Performance and Reception. Cambridge University Press, 1989, p 5-6
 - 8 - Spectacle Gratis, lithograph, Godefroy Engelmann, Hand coloured lithograph, paper, paint and ink, early to mid
-

-
- 19th century, Harry Beard Collection. Museum no. S.804-2009. ©Victoria & Albert Museum, London, <http://www.vam.ac.uk/users/node/8540> (Accessed 02.11.13, 14:01 CET)
- 9 - Thomas Rowlandson, Tegg's Caricatures No.57, Tegg, London, 1811, <http://en.wikipedia.org/wiki/File:Covent-garden-1.jpg> (Accessed 02.11.13, 14:01 CET)
- 10 - <http://www.hear-it.org/youth/Key-facts-about-noise-and-young-people> (Accessed 02.11.13, 14:01 CET)
- 11 - Jen Beaumont, Social Trends 41, Office for National Statistics, ISSN20401620
- 12 - Silvia Rief. Club Cultures: Boundaries, Identities and Otherness. Routledge, 2009, p.80
- 13 - David Byrne: How architecture helped music evolve, February 2010 at TED2010, http://www.ted.com/talks/david_byrne_how_architecture_helped_music_evolve? (Accessed 02.11.13, 14:01 CET)
- 14 - Silvia Rief. Club Cultures: Boundaries, Identities and Otherness. Routledge, 2009, p.79
- 15 - Roger Scruton, Why Beauty Matters, BBC Scotland, 2009, <http://www.facetofaceintercultural.com.au/a-fading-beauty/> (Accessed 02.11.13, 14:01 CET)
- 16 - Silvia Rief. Club Cultures: Boundaries, Identities and Otherness. Routledge, 2009, p.82
- 17 - Sean Levisman, Amon Tobin on ISAM 2.0: 'Strange and Heavy as F#ck With an Equally Messed-Up Story', http://blogs.miaminewtimes.com/crossfade/2012/09/amon_tobin_dj_interview_isam_miami_2012_tour.php (Accessed 02.11.13, 14:01 CET)
- 18 - amon-tobin-chaos-greek.jpg, <http://artistsandalgorists.com/fitcam-14-day-2/>, <http://www.residentadvisor.net/feature.aspx?1669> (Accessed 02.11.13, 14:01 CET)
- 19 - ISAM_Supplemental_Image1c1.png, Leviathan Productions, <http://www.lvthn.com/work/isam/> (Accessed 02.11.13, 14:01 CET)
- 20 - ISAM_Supplemental_Image2b1.png, Leviathan Productions, <http://www.lvthn.com/work/isam/> (Accessed 02.11.13, 14:01 CET)
- 21 - Derek Walmsley, Jeff Mills Interview, The Wire, November 2011, <http://www.thewire.co.uk/in-writing/interviews/jeff-mills-interview-by-derek-walmsley> (Accessed 02.11.13, 14:01 CET)
- 22 - "Jeff Mills and Flanders Philharmonic Orchestra, St. Anna Church, Gent 28/09/2013" Youtube user Lou DB, <http://www.youtube.com/watch?v=60SC9wS1m6U> (Accessed 02.11.13, 14:01 CET)
- 23 - Still of Brigitte Helm as Maria, Fitz Lang, Metropolis, Germany, Universal Film, 1927, http://www.imdb.com/title/tt0017136/mediaindex?ref_=tt_pv_mi_sm (Accessed 02.11.13, 14:01 CET)
- 24 - Robert Henke, <http://roberthenke.com/concerts/> (Accessed 02.11.13, 14:01 CET)
- 25 - Christopher Bauder & Robert Henke, GRID Performance - DMX winches, Kinetic Lights, RGB LEDs, <http://vimeo.com/whitevoid>, http://www.whitevoid.com/#/main/kinetic_lights/grid (Accessed 02.11.13, 14:01 CET)
- 26 - Andrea Aubert, GRID-20_ANDREA_AUBERT.jpg, <http://www.tetro.fr/?p=663&cat=4&lang=en> (Accessed 02.11.13, 14:01 CET)
-

6. art as a means

NA

7. architectural design

- 1 - Niaz Uddin, Ryan Holladay: Technology And Music, <http://etalks.me/ryan-holladay-technology-and-music/> (Accessed 02.02.14, 22:51 CET)
- 2 - Stills from 'The Making of Listen to the Light by BLUEBRAIN', Fiction Production, <http://fctn.tv/work/bluebrain/>, <http://vimeo.com/31024982> (Accessed 02.02.14, 22:51 CET)
- 3 - Stills from 'Bluebrain - The National Mall - Location Aware Album', Videographic Films, <http://www.vgfilms.com/post/7571814373/bluebrain-the-national-mall-promo>, <http://vimeo.com/25374903> (Accessed 02.02.14, 22:51 CET)
- 4 - <http://www.gps.gov/multimedia/poster/> (Accessed 02.02.14, 22:51 CET)
- 5 - National Wildfire Coordination Group, PMS 475 Basic Land Navigation, June 2007, Chapter 5: Global Positioning System, http://www.nwcg.gov/pms/pubs/475/PMS475_chap5.pdf (Accessed 02.02.14, 22:51 CET)
-



8. cultural programme

NA



9. sequence of atmospheres

- 1 - Roger Scruton, Why Beauty Matters, BBC Scotland, 2009, <http://www.facetofaceintercultural.com.au/a-fading-beauty/> (Accessed 07.08.14, 21:01 CET)
- 2 - Immanuel Kant, translated by J. M. D. Meiklejohn, London, Henry G. Bohn, 1855, Part 1 - Transcendental Aesthetic, Section 1 - Of Space, Pages 23-25.
- 3 - Ranzy Alwakeel, University of Leeds, IDM as a 'Minor' Literature: The Treatment of Cultural and Musical Norms by "Intelligent Dance Music", Dancecult: Journal of Electronic Dance Music Culture, 2009, ISSN19475403, Page 13.



10. civic facility

- 1 - <https://projects.invisionapp.com/d/main#/projects/1172117> (Accessed 12.09.14, 19:31 CET)
- 2 - Janko Vukotic, extract from Future Operatic prototype code, Crystal Media, Belgrade
- 3 - Image generated using Weavesilk, <http://weavesilk.com/> (Accessed 12.09.14, 19:31 CET)
- 4 - Attendance figures:
 - Mendip District Council, Glastonbury Festival Economic Impact Assesment Report 2007, <http://www.mendip.gov.uk/glastonburyfestivaleia> (Accessed 12.09.14, 19:31 CET)
 - ECB, ECB Annual Report 2013, <http://www.ecb.co.uk/ecb/about-ecb/ecb-annual-report/> (Accessed 12.09.14, 19:31 CET)



11. art format

- 1 - Kipnis, Jeffrey and Sanford Kwinter. April 05, 2011. 'Sanford Kwinter This Is Your Brain On Design', SCI-Arc Media Archive. Southern California Institute of Architecture, <http://sma.sciarc.edu/video/sanford-kwinter-this-is-your-brain-on-design/> (Accessed 07.08.14, 21:01 CET)
- 2 - Alexander von Humboldt, Reisetagebuch 1.-5. August 1803, Tal von Mexiko, <http://www.avhumboldt.de/?p=6527> (Accessed 07.08.14, 21:01 CET)
- 3 - Brian Hoy, Commercial Presentation for Future Operatic, Studio Subventive, <http://www.subventive.com/> (Accessed 07.08.14, 21:01 CET)
- 4 - Jana Rodic, Marko Todorovic and Brian Hoy, Live View Studio and Studio Subventive, on behalf of the National Museum of Serbia
- 5 - Historic Photograph Archive, National Museum of Serbia



12. performance

NA