KA-AU KNOWLEDGE ALLIANCE FOR ADVANCED URBANISM

VOLUME 13

IAAC_3RD WORKSHOP

FUTURE MOBILITY

Co-funded by the Erasmus+ Programme of the European Union

ka_au Knowledge Alliance for Advanced Urbanism

DELIVERABLE 2.4
WORKSHOP SEMINAR 3 REPORT

IAAC_WORKSHOP SEMINAR 3
FUTURE MOBILITY

AUTHORS:
Chiara Farinea
Mathilde Marengo
Areti Markoupoulou

CO-AUTHORS:
Andreu Ulied
Federica Ciccone

GRAPHIC DESIGN:
ACTAR
Irina Shaklova

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Iaac Institute for advanced architecture of Catalonia BARCELONA

Mcrit

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FOREWORD //
KNOWLEDGE ALLIANCE
FOR ADVANCED URBANISM

Knowledge
Alliance
for Advanced
Urbanism

THE PROJECT

The increasing availability of data creates new opportunities not only for the monitoring and management of cities but also for changing the way we describe, understand and design them, challenging many fundamental assumptions of urban design and planning professions. In order to promote the innovative education and training that emerging technologies require, higher educational institutions together with industrial partners have created the Knowledge Alliance for Advanced Urbanism (KA-AU). KA-AU develops courses, symposia and an educational and training platform, offering participants innovative education tools on planning and design. The group understands "Advanced Urbanism" as the sensitive integration of ICTs in cities, taking into consideration cultural heritage, environmental and social issues. "Advanced Urbanism" is about designing and planning processes, instead of just concrete artefacts, linking citizens, businesses and governments in sustainable urban culture. "Advanced Urbanism" requires changing traditional design and planning practices towards a more open, collaborative and interdisciplinary approach.

KA-AU is co-funded by the Erasmus+ Programme of the European Union.

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ABOUT THE WORKSHOP AND THE ORGANISERS

The workshop in Future Mobility was a 30 hours' course that provided the Master in city & Technology (MaCT) students, of diverse nationalities, with both practical and theoretical knowledge on future mobility practices.

Its structure consisted in a series of learning modules on mobility strategies distributed into ten weekly sessions, run from October 2017 to December 2018.

The workshop was delivered by engineers from MCRIT as well as by guest lectures, members of public authorities responsible for urban and transport planning.
It was led by Andreu Ulied, Dr. Eng. (UPC), MDesS (GSD) with the participation of experts on:
- Projects and plans in Barcelona from Barcelona Local Council and ATM:
• Carles Casamor, Arch. Head of Urban Planning Department
• Oriol Altisench, Eng., Co-ordinator of the tramway project
• Lluis Alegre, Eng., Technical Director of the ATM
• Laia Torres, Pol., Responsible for Participatory processes
- Models and methods for urban transport planning, from MCRIT:

• Frederic Lloveras, Eng.
• Adriana Martínez, Eng.
• Oriol Biosca, Eng.
• Efrain Larrea, Eng.
• Marite Guevara, Comm.

KA-AU members were invited to be the jury for the project presentations, sharing their view and experience with the students.

IAAC 3rd workshop is a project of IAAC
within the umbrella of
ka-au- Knowledge Alliance for Advanced Urbanism

in partnership with

within

a project co-funded by

Co-funded by the Erasmus+ Programme of the European Union

IAAC(Institute for Advanced Architecture of Catalonia) is an international centre for research, education, investigation; one of its objectives is to develop multidisciplinary programmes that explore international urban and territorial phenomena.
The Self-sufficiency Agenda, central to all research lines developed in IAAC, establishes the responsibility for confronting the process of global urbanisation from multiscalar operations and through prototypes that promote environmental, economic and social sustainability.

Mcrit is consultancy company with deep experience in assessing ICT impactsfunded by the 7th European Framework Program, as well as the Spanish and Catalan research programs, especially in the area of smart mobility. Currently, Mcrit is investigating, together with the Local Council how to use information gathered from mobile phones to monitor mobility demand in the city. Mcrit created ERSILIA Foundation aiming to transfer to the educational community at all levels the know-how of Mcrit in the use of advanced technologies, as well scenario-centric and project-based resources facilitating new educational paradigm.

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IAAC - 3RD WORKSHOP
FUTURE MOBILITY
APPLYING ENGINEERING ANALYTIC METHODS TO ASSESS A MAJOR URBAN TRANSPORT PROJECT: THE RENEWAL OF THE DIAGONAL AVENUE, BARCELONA

MAIN TOPICS

BACKGROUND

New social values and emerging energy and communication technologies challenge the way we live and move, as well as the way we plan and design cities.

During the second part of the 20th century, the exponential growth of automobiles and private mobility transformed cities dramatically, and public space and transport infrastructure were largely adapted to them.

While new urban motorways and bypasses were built, e.g. tramways were removed in many cities in America and Europe. It is expected that during the coming decades, new values (e.g. favouring more collaborative, sharing economies, health and safety concerns, more active citizen participation on urban planning and design…) and new technologies (e.g. fleets of electric/intelligent vehicles managed collectively, smart management of public spaces…) will dramatically change cities, particularly, in the more developed world.

It is expected that not only cities will change but the planning and design processes as well.

WORKING PROCESS

The target of the workshop was to reflect on these issues through a project of the city of Barcelona: the renewal of the Diagonal Avenue linked to the interconnection of existing tramways.

The role of students was to critically review the proposals already presented by the Local Council, further elaborating their own.

The students worked on their own project proposal while attending to a number of specialist lectures given by engineers working for the Local Council.

In lab sessions, different specialists presented and discussed software tools and analytic models used when designing and assessing the impacts of alternative mobility projects, including traffic forecast, micro/macro simulation, cost-benefit and financial assessment, citizen participation and public communication.

Following initial presentations of the project delivered by Local Council representatives, urban planning professionals presented and discussed working methodologies and software tools used when designing and assessing the impacts of alternative mobility and urban space solutions, including traffic forecast, microsimulation, cost-benefit socioeconomic assessment and financial assessment of mobility and real estate impacts,
and citizen participation and communication approaches.

These lectures were always be based on studies carried out in relation to the Diagonal renewal.

TECHNOLOGY

Students were provided with databases, and applied different software tools – mostly GIS and MS EXCEL, VISUM, VISSIM (PTV), Geomedia - Transportation (Hexagon) and TransCad (Caliper) to carry out analysis and representation.

OUTPUT

Based on the information gathered from the lectures, students critically reviewed existing proposals analysed their likely impacts – social, economic, environmental - developing their own alternative design proposals and be able to compute (e.g. using MS EXCEL macros), including Cost-Benefit indicators in order to assess them.

PEDAGOGIC VALUE

The paramount value was to expose students to engineering mind-sets related to urban project's concept, design, implementation and operation (CDIO), as well as to advanced simulation tools for information gathering, forecast and economic assessment

Mcrit

Iaac Institute for advanced architecture of Catalonia BARCELONA

ka_au Knowledge Alliance for Advanced Urbanism

Co-funded by the Erasmus+ Programme of the European Union

Diagonal_Case study

STRUCTURE OF THE WORKSHOP

The workshop was structured in Labs with the MCRIT planning engineering company using a variety of software platforms, and Lectures carried out by experts from the Local Council and the Barcelona Transport Authority.

The design projects were developed by students working on groups of 4:
• Renewal of an urban motorway (Ronda de Dalt)
• Renewal of a major avenue in the center of the city (Diagonal Avenue)

A list with 5 suggested reading was provided:
• C. Buchanan, (2015) "Traffic in Towns"
• G. Dupuy, (2008) "The Urbanism of Networks"
• R. Kurzwel, (1999) "The Age of Spiritual Machines"
• W. Mitchel, (2013) "Me++", (1995) "City of Bits"
• S. Graham, (2001) "Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition"

STUDENT'S DELIVERABLES

Presentation of design and planning exercises (12 December). Students were organised in groups.
Presentation of a discussion paper on Advanced Urbanism (3 pages, 28 November) based on suggested readings, as well as in any additional reading of student's choice.

DESIGN EXERCISES

• Renewal of Diagonal Avenue as a green infrastructure. Design of public space and alternative solutions for public and private mobility. Possible traffic impact.
• Renewal of Ronda de Dalt as a public transport corridor. Design alternatives. Possible traffic impact.

Tuesday 10th October	**Barcelona Plans and Projects 1980s-2020**. Introducing the tramway interconnection and Diagonal renewal as a case-study. Lecture by **Carles Casamor** (Barcelona City Council. Head Urban Projects)
Tuesday 17th October	**Advanced Urbanism: Mobility of the Future** Lecture & Discussion by Andreu Ulied
Tuesday 24th October **at MCRIT (Espriu 83)**	**Macro and micro traffic simulation models Lab (I)** Lab on micro-simulation (VISSIM) by Federic Lloveras (Mcrit) Lab on macro-simulation (Geo-Transportation) by Raquel López (Mcrit)
Tuesday 31th October **at MCRIT (Espriu 83)**	**Macro and micro traffic simulation models Lab (II)** Lab on macro-simulation (VISSUM) by Frederic Lloveras (Mcrit) Lab on macro-simulation (VISSUM) by Adriana Martínez (Mcrit)
Tuesday 7th November	**Tramway interconnection's Project. impact on Barcelona Mobility System** Lecture by **Oriol Altisench** (Barcelona city Council. Coordinator of the tramway project) Debate by Andreu Ulied
Wednesday 15th November **at MCRIT (Espriu 83)**	**Geographic Information Systems Lab** Database management, spreadsheet & Geographic Information Systems by Efrain Larrea (Mcrit) SIG for modelling by Frederic Lloveras (Mcrit)
Tuesday 21st November	**Tramway interconnection's impact on urban and metropolitan transport's networks management and regulation plans** Lecture by **Lluis Alegre** (ATM, Technical Director) Debate by Andreu Ulied
Tuesday 28th November **at MCRIT (Espriu 83)**	**Social, Economic and Environmental & Financial models Lab** Lab on economic assessment models (XLS) by Oriol Biosca (Mcrit) Lab on financial assessment models (XLS) by Efraín Larrea (Mcrit)
Tuesday 5th December	**Co-creation and design thinking. Communication and participatory processes.** **Laia Torres** (Responsible Citizen Participation, Ajuntament Barcelona) Marite Guevara (Ersilia Foundation)
Tuesday 12h December	**FINAL PRESENTATION BY STUDENTS**
Tuesday 19h December	**FINAL DISCUSSION ON "ADVANCED URBANISM"** Open debate based on course readings and student's design/strategic proposals

FUTURE MOBILITY
TUTOR, SME AND STUDENTS
WITHIN THE FRAMEWORK OF KA-AU

The workshop in Future Mobility gave the students knowledge of design and assessment of a major urban transport project by applying engineering analytic models and methods – information, micro/macro forecast and project cost-benefit and multicriteria.
The tutor created a calendar of classes (afore detailed) focusing on a schedule ideated for visualising a clear picture of the current state of the art and the future approaches regarding this issue.
The course was led by Andreu Ulied, Partner Director of MCRIT , SMe involved into KA-AU Agenda.

Andreu Ulied is Doctor Engineer and Master in Planning by Harvard University, an expert on strategic foresight and policy and project appraisal. As Partner Director of MCRIT he has worked as a consultant in most European and not EU countries for local and international public institutions, as well as for private companies mostly in the transport, energy and urban development field. He was Associate Professor at the UPC, teaching History of Science and Technology. Member of the Urban Planning Commission of Catalonia, the Mobility Advisory Board of the city of Barcelona, the Scientific Committee of the Institute for Advanced Architecture of Catalonia, the Center of Studies on Transport of the UPC and the Urban Committee of the Engineers Association of Catalonia, where he also co-ordinates the working group on project and policy appraisal.

Case Study

ph . barcelonaarchitecturewalks.com

MACT STUDENTS

This IAAC_KA-AU workshop was dedicated to the students of the Master in City and Technology 2017-2018.

The MaCT is a program oriented in training Change Makers that City Government Administrations, the Industry and Communities need in order to develop projects for the transformation of the cities. From urban planning to urban management and citizen-based services, it foresees new city economy and new city management models through the creation of efficient, responsive, decentralised, productive and hyper-connected systems to be implemented in order to build the city of the future.

The students of this Master's class came from different parts of the world and from different professional and academic backgrounds:

- Alba Alsina - Spain
- Camille Feghali - Canada/Lebanon
- Irene Rodriguez Varas - Spain
- Ivan Himanen - Finland/USA
- Najla Aldah - UAE
- Ren Jiale - China
- Saule Gabriele Petraityte - Lithuania
- Venessa Williams - Nigeria

More in detail, to better understand the learning context, the Master in City & Technology (MaCT) is a programme which takes place in Barcelona, the capital of urbanism, this programme aims at redefining the practice of urban planning, urban management, strategic data analysis and citizen-based services. The MaCT focuses on the creation of applied visions that have the power to fuel progress for many generations, by allowing its participants to not only actively wonder and question progress but, also, to re-imagine it and choreograph it.

MACT STUDENTS

In the MaCT, we shape the cities of the future by designing new city economies and new models of managing our cities through the creation of efficient, responsive, decentralised, productive, digital and hyper-connected systems.

STUDENT PROFILES

The Master in City and Technology is aimed at engineers, architects, designers, economists, sociologists, entrepreneurs, environmental scientists, urban planners and urban designers and graduates related with the transformation and management of our cities and technologies of information.
The course aims to transform these people into social innovators, project leaders and chief strategists who will foster the conversion of art, science, industry and politics towards the unfolding of a new future.
Once successfully finished, IAAC students will then join the IAAC Alumni Community, an active and dynamic network of visionary professionals spread around the world, promoting principles and applications of Advanced Architecture and exploring new academic and research initiatives, leading to award-winning practices or working for internationally acclaimed firms and institutions.
There is currently a lack of professionals capable of leading projects where the aim is to transform our cities from 20th-Century production and distribution models to the 21st-Century paradigms.

The MaCT course aims to create future professionals who will be able to undertake such projects, such as Urban Consultants and Managers, Managers of Real-Time and Open Data, Smart–City Planning Consultants, City Administration Digital Officers, Smart City Project Managers and Urban App Developers.

Moreover, graduates of the MaCT will be equipped with the knowledge and tools to work in the public sector as Public Policy Administrators, Public Space Administra-

tors, Public Space Administrators, Mobility Analysts and Urban Planners.
In addition to the public sector, we aim to create strong professionals in the private sector such as Environmental Resources Managers, City Waste Managers, Clean Energy Optimisation Managers, Urban Welfare Inspectors, Urban Studies Advisors and finally, experts in Urban Data visualisation, Mobility Micro and Macro Simulations, GIS Software, and Augmented and Virtual Reality. In general, our goal is to create future professionals who will be able to work in a series of departments, depending on their focus of expertise. Such sectors include Renewable Energy, Innovation, Infrastructure and Transportation, Smart–Technologies, Urban Consulting, Academies, City Management, Natural Resources, Public Spaces, Recycling and Public Waste, Data Visualisation and, of course, Urban Planning.

ABOUT THE COURSE

The MaCT is directed by Architect and Researcher, Areti Markopoulou and the programme is led by internationally renowned academics, companies and industries. The programme aims to form industry, innovation and political leaders and thinkers which will guide our cities' welfare to a positive change.

CONTEXT AND AGENDA

The rapid and exponential growth of technology and urbanisation has created a new problem for change-makers which is the uncertainty of their applications. The course focuses this question by defining what will most affect the future needs of humanity, and by addressing the question of the implementation of Information and Communication Technology (ICT) in different levels of the environment. This is developed thanks to a broad experience in urban research that has been carried out by IAAC over the last years in fields like the Internet of Things, Smart Buildings, Eco and Productive neighbourhoods, Internet of Energy, Digital Fabrication, Urban Gamification and Intelligent Cities.

The programme aims to develop and exhibit new categories of projects, technologies and solutions that can be meaningfully extended systematically to the cities of the world, thus helping them to become more efficient and more consistent with today's exponential technological evolution.

LEARNING OBJECTIVES

Every candidate attends and develops technological seminars, city studies, cultural analysis, and pilot projects in order to have a global comprehension of the development of technologically driven urban projects in real-life environments. The programme prepares candidates to be the key actors capable of making connections between disciplines where none were possible or even considered before. Participants are introduced to concepts such as Open Innovation as well as learning all the new necessary processes and tools on how cities, surrounding regions and rural areas, can evolve towards sustainable, open and user-driven innovation eco-systems to boost future internet research and future internet-enabled services of public interest and citizen participation.
The candidates are introduced to a large variety of technological tools and software that are imperative for the multi-scalar representation and understanding of the urban environment. From 3D modelling to parametricism, to coding, to Big Data manipulation, to simulations and Geographical Information Systems, students are calling to learn all of the necessary tools that will allow them to become effective and efficient project developers as well as communicators.

The research is developed towards new modes of Economic Governance based on Public-Private partnerships and decentralised collaboration relying on the policy networks found in civil society. Finally, Master candidates are immersed in new ways of approaching the Urban Mobility and Accessibility systems in order to learn how to develop and implement symbiotic systems of transportation, based on real-time data that can be further articulated into responsive systems and metabolic organisations, where small decisions can have a large impact on the urban scale.

Projects are integrating the design of public space and buildings, service infrastructure, user interaction and technologies of information, developing technical, social and economic skills. This allows MaCT students to develop the new economy of city services and new models of city management that go beyond the potential of the Internet of Things.

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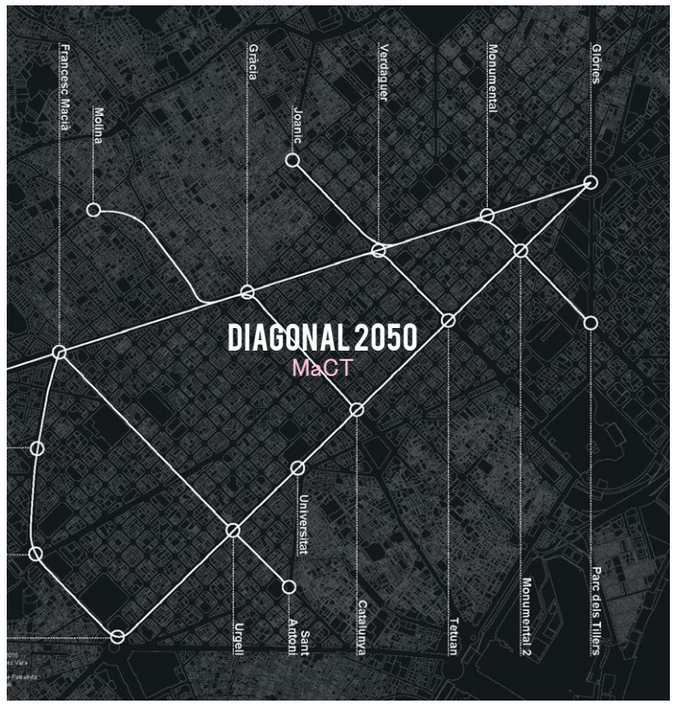
OUTPUTS



Students' Outputs (more info at: http://www.iaacblog.com/programs/courses/mact/2017-2018-mact/future-mobility-mact-2017-2018-1st/)

DIAGONAL 2050

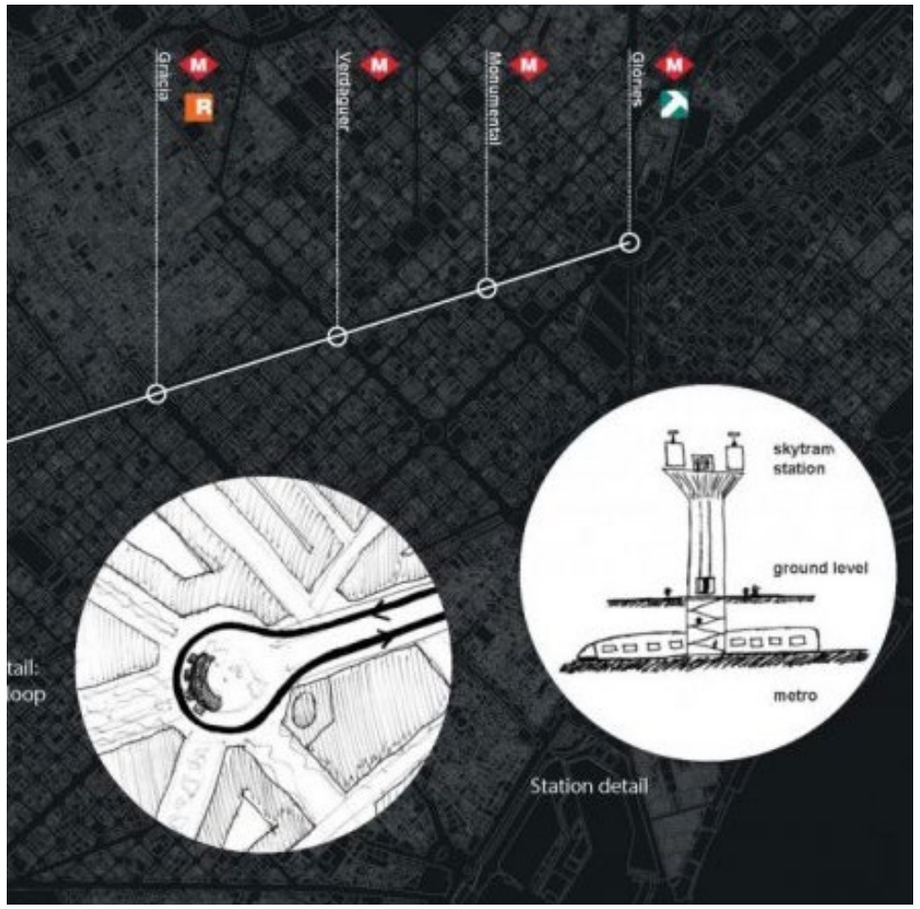
Students: Najla Aldah, Camille Feghali, Ivan Himanen, Saule Gabriele Petraityte, Irene Rodríguez Vara

PILLAR 1: Prevailing scientific evidence says that the environment is changing due to waste generated by humans. Cities, as the locations of the highest concentration of humans, need to respond to this change as it happens. Part of this response will be self-sufficiency; i.e. creating as much as one consumes. Barcelona has signed onto the Fab City Global Initiative, which projects fulfilment by 2054.

PILLAR 2: Based on several lectures and presentations by engineers and planners on the topic of Barcelona's current mobility, the majority of momentum is directed towards extending the Tram line along the central portion of Avinguda Diagonal between Plaça de les Glòries and Plaça de Francesc Macià, connecting Trambaix and Trambesòs.
The plan is being promoted as beneficial to businesses, people, and the environment. However, looking at the renderings, benefits to the environment are clearly lacking.
More needs to be done.

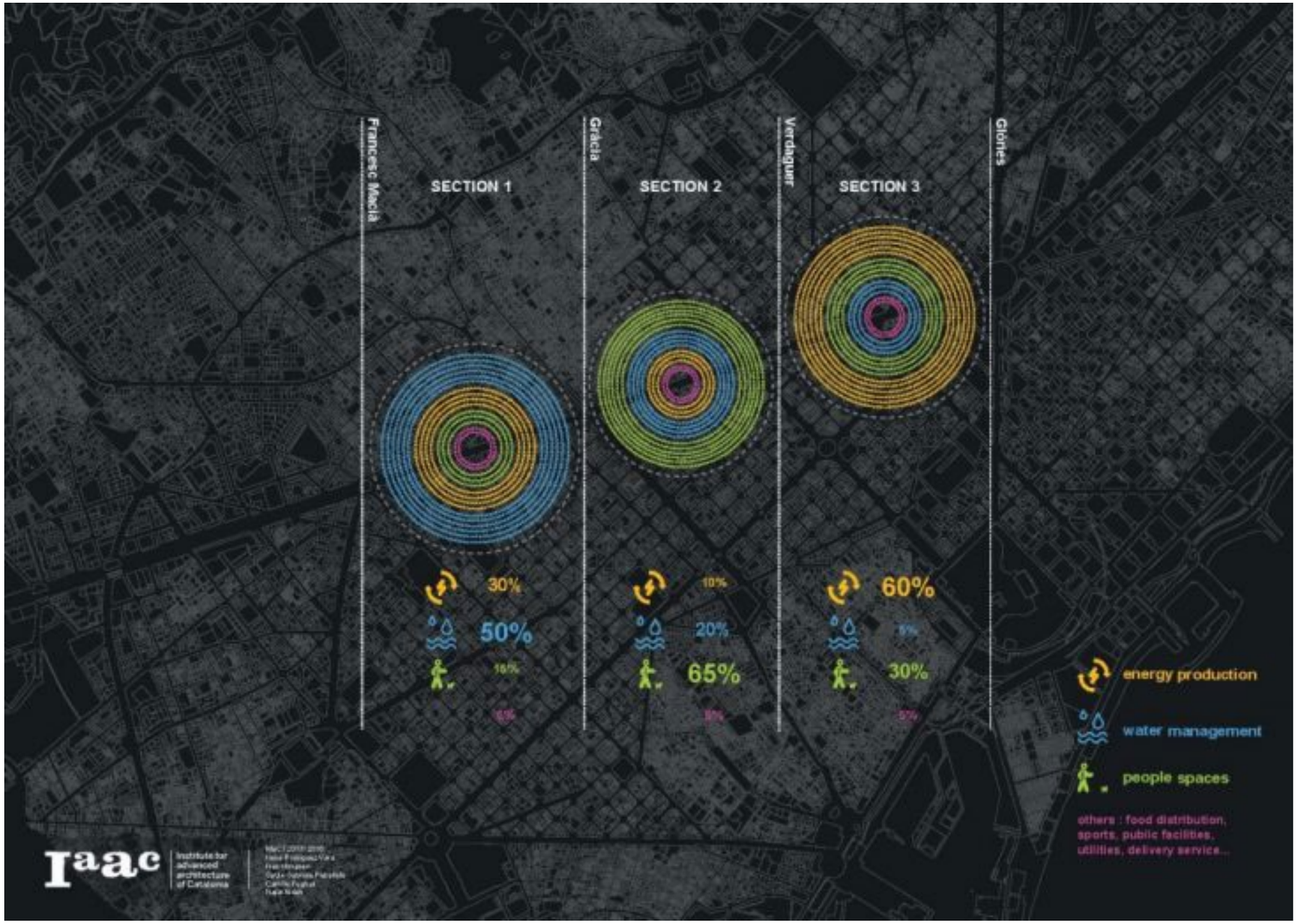
PILLAR 3: Automated vehicles are on the rise, even though the established mobility paradigm is framed primarily through a 20th-century PUBLIC vs PRIVATE opposition. What if we are on the cusp of a shift from PRIVATE vs PUBLIC to AUTOMATED vs MANUAL?

more info at; http://www.iaacblog.com/programs/diagonal-2050/



Students Elaboration

group 01



Students Elaboration

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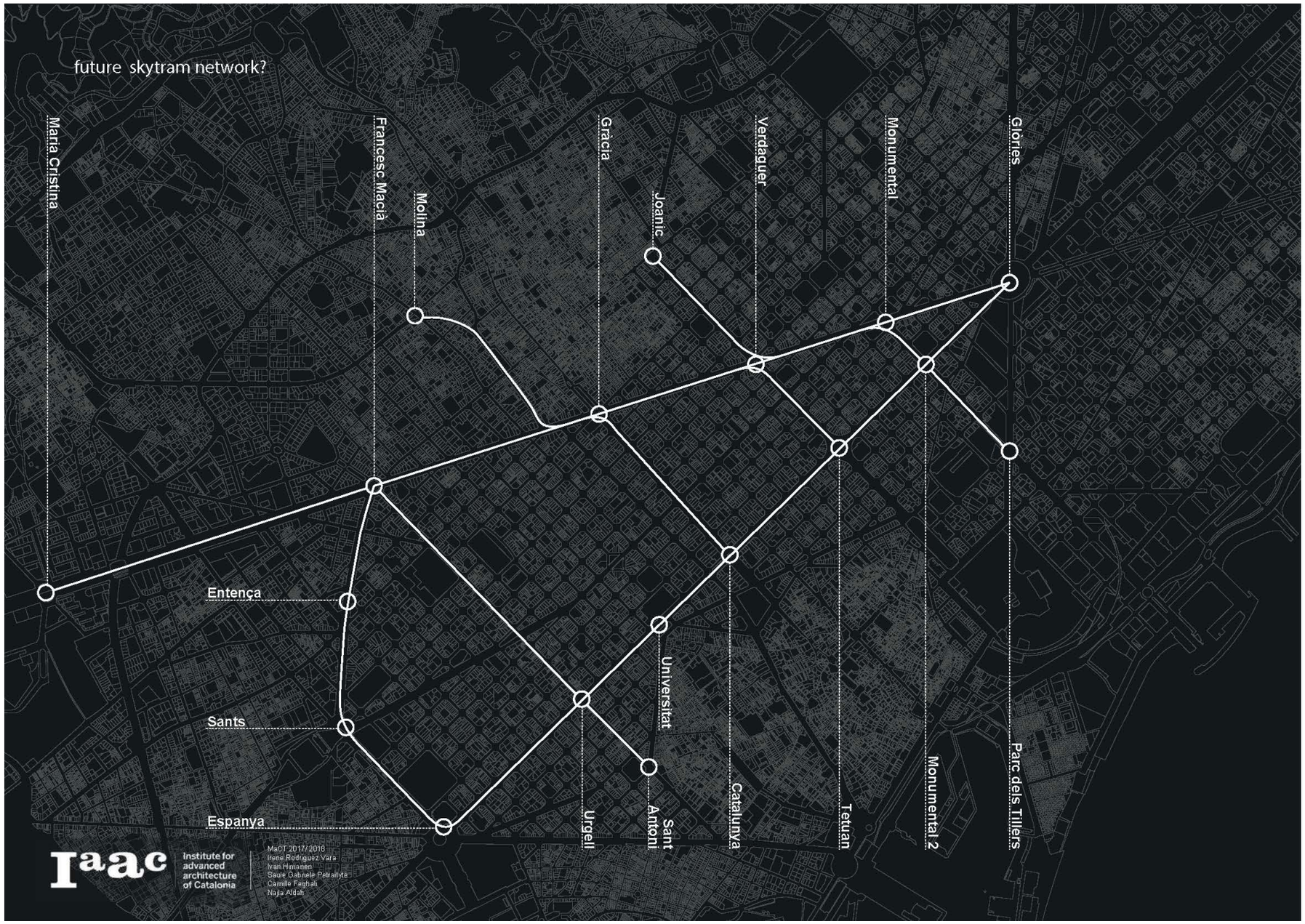
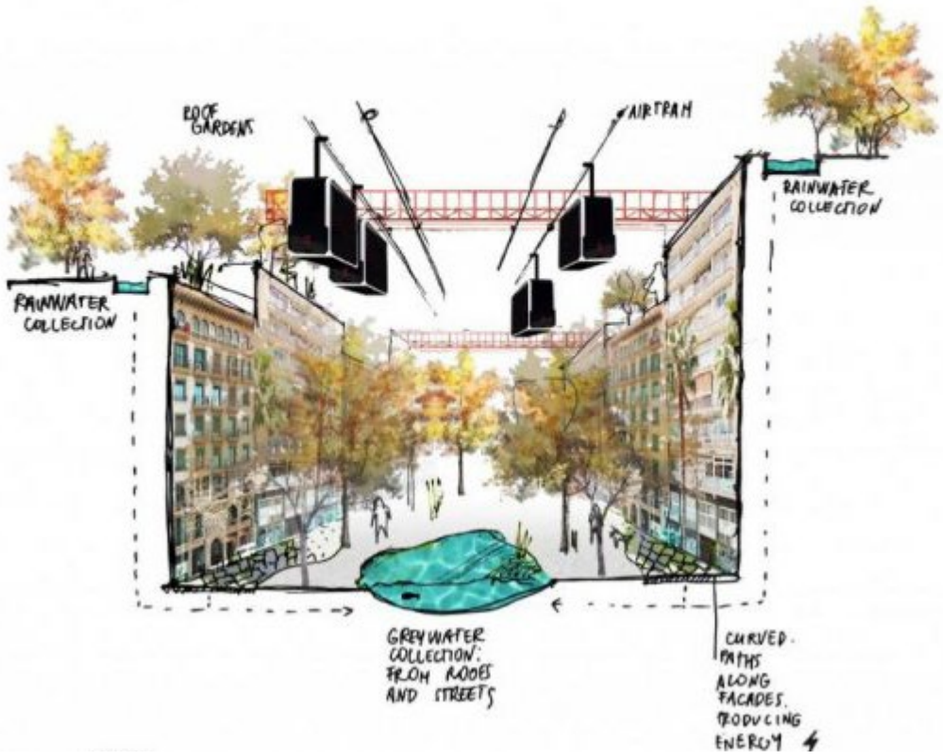
Students Elaboration

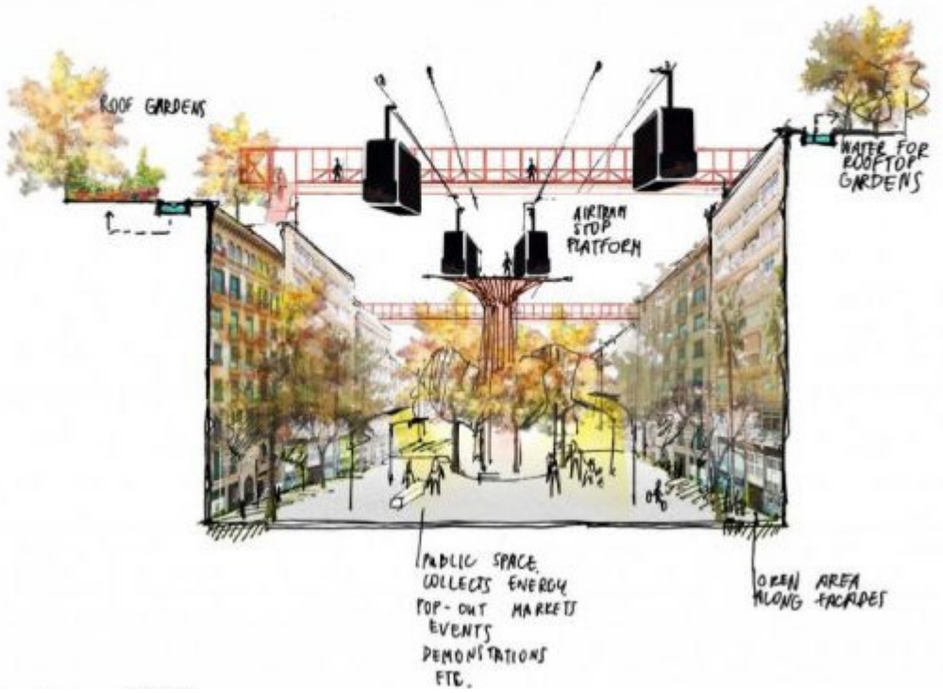


Students Elaboration

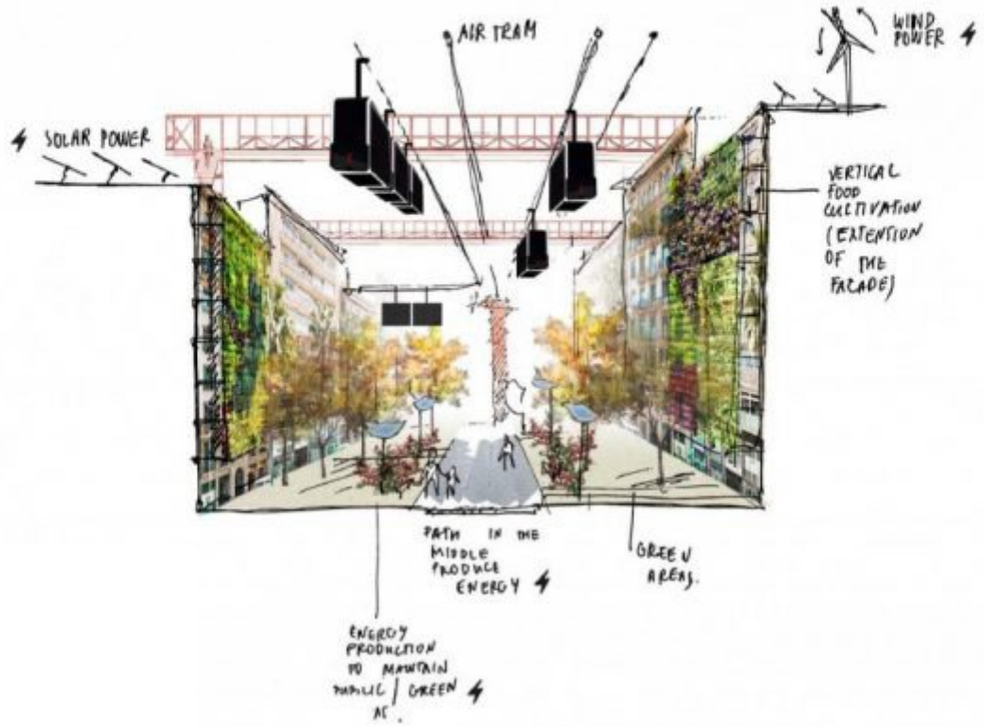
SECTION 1 | PRIORITY: WATER



SECTION 2 | PRIORITY: PEOPLE



SECTION 3 | PRIORITY: ENERGY PRODUCTION



LES RONDAS

Students: Alba Alsina Maqueda, Ren Jiale and Venessa Williams

Recent discussions on Les Rondes- the ring roads encircling Barcelona and parts of Catalunya- inspired the conceptual proposal for public transportation systems along these highways. Currently facing problems of traffic, congestion and air pollution, Les Rondes might be on the verge of significant changes.

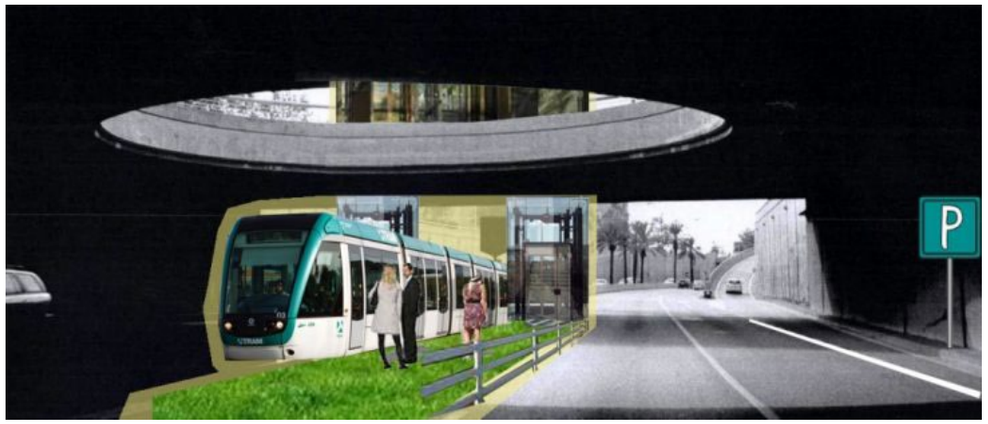
Seven highways intersect with Les Rondes, creating six critical junctions which are prone to high level of traffic especially at peak hours. An average of two million people come into and leave the city daily, all along Les Rondes and the intersecting highways.

Junctions in general take up a lot of space in the city, and studies show that the total area of junctions in the metropolitan area equals twice that of Le Eixample. What if junctions could become multifunctional nodes, with infrastructure to cater to different activities and users at different times?

Inspired by David Bravos proposal to introduce tramways on Les Rondes, the first conceptual proposal seeks to extend the tramway network throughout the city as well. This would help reduce traffic and congestion on the highway, and also reduce the amount of air pollution through the reduced number of private vehicles along this road.
The junctions would also be maximized as Hubs, providing infrastructure for temporary work spaces, public facilities, and transition points of different modes of transport.

The Hub would be located on the top level of Les Rondes, for easy access by pedestrians, and consist of lifts that take passen-

Students Elaboration



gers directly to the tram platforms. Parking would also be made available on the road edges for private car drivers to continue their journeys via the tramway.

The second proposal is for the Shuttle Bus and City Car. This would extend the public transport system beyond the Metropolitan ring of Les Rondes to include the regional area. These buses would bring passengers from these parts and connect them to Electric City Cars located along the major intersections with Les Rondes. These shared vehicles are sustainable and take up less space than the average private car.

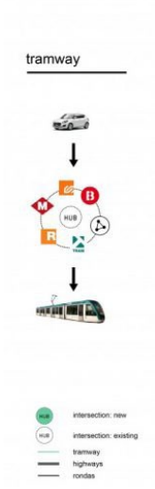
The final concept proposes a fast and futuristic means of public transportation along the entire Catalunan region. Hyperloops are already being tested in a few cities for long distance travel. Having this along Les Rondes could be the solution to its daily congestion and pollution issues

Students Elaboration

more info at:
http://www.iaacblog.com/programs/les-rondes/

Students Elaboration


hyperloop
hyp
rondas
highways
shuttlebus: new
intersection: existing


tramway
HUB
intersection: new
intersection: existing
tramway
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GUESTS LECTURES & JURY

One of the targets of the workshop was to create a real debate on the topic, involving professionals from the real local sphere, so a series of experts were invited to participate with specific lectures within the course, giving to the students the possibility to personally interact with them.
The course was delivered by engineers from MCRIT as well as by guest lectures, members of public authorities responsible for urban and transport planning.
The role of engineers was to organise living labs at MCRIT offices were analysis of real project-cases with advanced software tools were carried out, while the role of guest lectures was to introduce students to key urban and mobility planning issues in relation to Barcelona and the tramway project. Guest lectured acted as a jury as well.

1. **Carles Casamor** - Head Urban Projects, Barcelona City Council
2. **Frederic Lloveras** - Vissum, Mcrit
3. **Raquel López** - Geo-Transportation, Mcrit
4. **Adriana Martìnez** - Vissum, Mcrit
5. **Oriol Altisench** - Coordinator of the tramway project, Barcelona City Council
6. **Efrain Larrea** - database Managment and G.I.S. , Mcrit
7. **Frederic Lloveras** - SIG for modelling, Mcrit
8. **LLuis Alegre** - Technical Director, ATM
9. **Oriol Biosca** - Lab on economic assessment models, Mcrit
10. **Efrein Larrea** - Lab on economic assessment models, Mcrit
11. **Laia Torres** - Responsible Citizen Participation, Ajuntament Barcelona
12. **Marité Guevara** - Ersilia Foundation

Carles Casamor

Architect by ETSAB, Head of the Department of Urban Projects for the Municipality of Barcelona and of the Infrastructural Department of the Institute of Parks and Gardens. Professor in different masters courses.

Frederic LLoveras

Civil and traffic engineer expert in traffic micro-simulation, gathering traffic supply and demand data at Mcrit. Frederic is an engineer graduated at the Polytechnic University of Catalonia, he made the final thesis at the Center of Traffic and Transportation of Technical University of Denmark.

Raquel López

Expert in mobility forecast studies. She is a Civil Engineer by UPC, working at MCRIT as traffic engineer expert, specialist in smart mobility, forecasting demand projects for large transport infrastructures in either public or private transportation systems.

Adriana Martìnez Vidal

Transport Planning Engineer at Mcrit, graduated at Università Politecnica de Catalunya, she studied also Civil Engineering at the Technische Universität Dresden of Dresden.

Lluis Alegre Valls

Engineer graduated in the area of Economic - financial Direction at E.S.A.D.E., Master in Urban development Management(UPB), Postdegree in Urban development Management and Environment UPB, Postdegree in Planning and management of the Mobility UPC, he is currently the Technical Director of ATM.

Oriol Biosca

Engineering from UPC, he has been involved in strategic studies at local, regional and international level in relation to regional development, territorial strategy analysis and cohesion policies. Currently part of Mcrit as Coordinador of Project for the Eu Commission.

Efrein Larrea

Expert in financial evaluation of transport projects. He is an engineer (UPC) with more than 10 years' experience as specialist in financial evaluation and transport economics, both at European and Spanish levels.

Laia Torres

Responsible Citizen Participation for the Ajuntament of Barcelona, for Barcelona Ecologia and Hàbitat Urbà.

Marité Guevara

Director of Ersilia Foundation and expert in communication and dissemination. She holds Master degrees in Communications and Publishing by the UP, and a Bachelor in Communication and Journalism from the University of Puerto Rico, and New York University. She is specialist in scientific and technologic communication and education.

Moreveor, the final jury was composed by **Marité Guevara,** Ersilia Foundation; **Chiara Farinea**, IAAC, Head of EU Project Department; **Alex Mademocoritis**, IAAC, Mact Coordinator; **Federica Ciccone**,IAAC, EU Project Department and as guest Jury 's Members : **Oriol Altisench, Carles Casamor** and **Laia Torres**, Barcelona Local Council; **LLuis Alegre**, Autoritat del Transport Metropolitá.

Final Presentation Programme

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CONCLUSIONS AND RECOMMENDATIONS

The course was very challenging for both engineers and students –all trained as architects.

Engineers tend to be highly specialised, and possess advanced analytic competencies, while students of architecture tend to have more comprehensive, synthetic and creative, but may lack scientific and technical competences.

The readings proposed, all coming from engineering studies, were all new for students.

The workshop was very challenging, in this respect, and future editions will benefit from reducing the actual contents and/or to extending the program more hours.

Also, the technical background of students should be pushed up during the first classes by providing them with the necessary scientific and economic background, software tools for macro/micro-simulations and a number of exercises so they become able to use and apply these tools by themselves, since the beginning.

In the end, the projects developed by students showed a good understanding of fundamental concepts introduced in the workshop, such as multicriteria and cost-benefit assessment of alternative urban design projects. In this more conceptual dimension, the workshop was successful indeed.


SECTION 1
SECTION 2
SECTION 3
30%
50%
20%
65%
60%
30%
energy production
water management
people spaces


skytram:
extent, stations, connectivity
Terminus detail:
Continuous loop
Station detail

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CREDITS & PARTICIPANTS

TUTOR:
Andreu Ulies - Mcrit

GUESTS LECTURES:
Carles Casamor
Frederic Lloveras
Raquel López
Adriana Martìnez
Oriol Altisench
Efrain Larrea
Frederic Lloveras
LLuis Alegre
Oriol BioscaEfrein Larrea
Laia Torres
Marité Guevara

JURY MEMBERS:
Carles Casamor
Frederic Lloveras
Oriol Altisench
LLuis Alegre
Laia Torres
Marité Guevara
Chiara Farinea
Federica Ciccone
Marion Moustey
Manuel Gausa
Ricardo Devesa

KA.AU COMMITTEE
Andreu Ulied - Mcrit
Chiara Farinea - IAAC
Federica Ciccone _IAAC
Mathilde Marengo_IAAC
Areti Markopoulou_IAAC
Marité Guevara- Fundacio Ersilia
Marion Moustey_ENSAM
Manuel Gausa_UNIGE
Ricardo Devesa_Urban Next

STUDENTS:
Alba Alsina Maqueda
Ren Jiale
Venessa Williams
Najla Aldah
Camille Feghali
Ivan Himanen
Saule Gabriele Petraityte
Irene Rodríguez Vara

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GENOVARCHITETTURA

ENSAM École nationale supérieure d'architecture Montpellier

SANTA & COLE

ACTAR

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inAtlas

usefulsimpleprojects

darts

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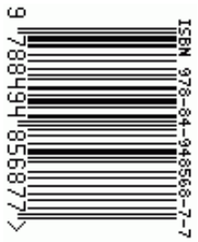

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