AAU crenau ambiances architectures urbanités

IGN INSTITUT NATIONAL DE L'INFORMATION GÉOGRAPHIQUE ET FORESTIÈRE

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École thématique CNRS 2017

vu pas vu

Visibility analysis dedicated to the understanding of urban morphology

October 23rd-27th 2017

Saint-Paul-En-Jarez - France

CENTRALE NANTES

ambiances RÉSEAU INTERNATIONAL INTERNATIONAL NETWORK

IMU Intelligences des Mondes Urbains UNIVERSITE DE LYON

MAGIS

LIRIS

OUEST INDUSTRIES CRÉATIVES Recherche, Formation & Innovation en Pays de la Loire

Summary

Dear attendee!

We are happy to welcome you in Saint-Paul-en-Jarez at the first Vu-pas-vu-2017 thematic school.

This participant booklet contains several practical information regarding the organization of the 5-day event.

From the Time Schedule to the "Appliance in a Nutshell", from "Last mile solution" to main phone numbers... we hope it will be helpful.

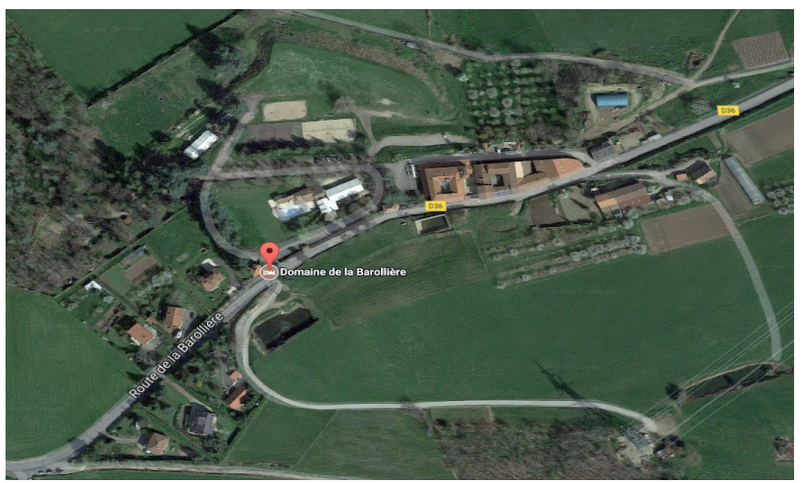
We warmly encourage you to seize the opportunity to forge sustainable and fruitful relationship with all other participants, but also to ensure to benefit the most from this week.

Thomas Leduc

Mickaël Brasebin

Reach the thematic School

The thematic school will take place in the Barollière domain *(http://www.hotel-restaurant-barolliere.fr/)* located in Saint-Paul-en-Jarez (France), from Monday 23rd to Friday 27th october 2017.



Last mile solutions

Due to school holidays, the regular bus (#44) is cancelled from Oct. 21st to Nov. 5th 2017. If you have to be driven from Saint-Chamond railway station to the hotel, please call us (see the phone numbers below).

Contacts

If you have to be driven from Saint-Chamond railway station to the hotel, or in case of emergency, do not hesitate to call

Hôtel Domaine de la Barollière
2250 route de la Barollière
42740 Saint-Paul-en-Jarez

Phone number: +33(0) 477 227 105

© photo: Domaine de la Barollière

List of participants

Alessandro	Araldi	UMR 7300 ESPACE
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Mickaël	Brasebin	IGN LaSTIG/COGIT
Claudia	Cassatella	Politecnico di Torino
Maxime	Colomb	IGN LaSTIG/COGIT
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Kassim	Dabar Houffane	Univ. Jean Monnet
Dafna	Fisher-Gewirtzman	Technion – IIT
Pietro	Florio	EPFL LESO-PB
Francesca	Fontana	Agence UP
Giovanni	Fusco	UMR 7300 ESPACE
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Mohammed Amine	Hafid	Centre des Techniques Spatiales, Oran
Florence	Jacquinod	EIVP
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Eugenio	Morello	Politecnico di Milano, labsimurb
Steffen	Nijhuis	TU Delft, Fac. of Arch. and The Built Env.
Nicolas	Ovtracht	UMR 5593 LAET (DR07)
Samuel	Robert	UMR 7300 ESPACE
Valerio	Signorelli	Univ. College London, CASA
Daniel	Siret	UMR 1563 AAU - CRENAU
Maxim	Spur	UMR 1563 AAU - CRENAU
Jacques	Teller	Univ. de Liège

Committees

Scientific committee:

> Manuel Appert - UMR EVS, Université Lyon 2, France
> Mickaël Brasebin - LASTIG, Université Paris-Est, France
> Claudia Cassatella - Politecnico di Turino, Italy
> Dafna Fisher-Gewirtzman - Technion-IIT, Israel
> Gilles Gesquière - Université Lyon 2, France
> Florence Jacquinod - EIVP/ UMR EVS, France
> Thomas Leduc - AAU, ENSA Nantes, France
> Eugenio Morello - Politecnico di Milano, Italy
> Steffen Nijhuis - TU Delft, Netherlands
> Daniel Siret - AAU, ENSA Nantes, France
> Jacques Teller - Urban & Environmental Engineering, ULg, Belgium

Organizing committee:

> Marine Bouquet, administration, AAU, ENSA Nantes, France
> Véronique Dom, communication, AAU, ENSA Nantes, France

Planning

Day	Work schedules	Session	Speaker
Monday Oct. 23, 2017	12h00 - 13h30	Lunch	
	13h30 - 14h00	Opening welcome	T. Leduc + M. Brasebin
	14h00 - 16h00	Dynamic qualities of the Gibsonian 'visual world' adapted to the study of the urban form	J. Teller
	16h30 - 18h30	Introduction to 3D modeling	M. Brasebin
	19h00 - 20h30	Dinner	
	21h00 - 22h00	Round table introduction	
Tuesday Oct. 24, 2017	9h00 - 10h30	Linking landscape perception and planning regulation	C. Cassatella
	11h00 - 12h30	Designing the visible urban scene: tools and applications of visibility analysis in urban design	E. Morello
	12h30 - 13h30	Lunch	
	14h00 - 16h00	Exploring the skyline with GIS	S. Nijhuis
	16h30 - 18h30	Objectification of the material dimension of the skyline: iterative design between geographers and computer scientists	G. Gesquière + M. Appert
	19h00 - 20h30	Dinner	
Wednesday Oct. 25, 2017	9h00 - 10h30	Surrounding facades, morphological signatures - tools available to spaces designers	T. Leduc
	11h00 - 12h30	Seen or not (already) seen	V. Signorelli
	12h30 - 13h30	Lunch	
	14h00 - 16h00	Quantifying the perception of density	D. Fisher-Gewirtzmann
	16h30 - 18h30	Multiple Fabric Assessment (MFA) - Geo-processing Analysis of Urban Fabrics in a Metropolitan Area	G. Fusco
	19h00 - 20h30	Dinner	
	21h00 - 22h00	Seeing in colors	D. Siret
Thursday Oct. 26, 2017	9h00 - 10h30	Experiments on the study zone	
	11h00 - 12h30		
	12h30 - 13h30	Lunch	
	14h00 - 16h00	Experiments on the study zone	
	16h30 - 18h30		
	19h00 - 20h30	Dinner	
	21h00 - 22h00	Presentation of the experiments results	
Friday Oct. 27, 2017	9h00 - 10h30	Uses of visibility analysis and City Information Modelling	F. Jacquinod
	11h00 - 12h30	Conclusion, perspectives and following steps	M. Brasebin + T. Leduc
	12h30 - 13h30	Lunch	

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Introduction to computed visibilities
Introduction to computed visibilities
Introduction to computed visibilities
Analytical methods
Utility and Usability
Utility and Usability
Analytical methods
Analytical methods
Analytical methods
Utility and Usability
Utility and Usability
Conclusion to computed visibilities

Day by day program

Preliminary program:

› Empirical methods dedicated to analyze urban morphology
› Introduction to computer tools
› Sky and sun visibility analysis
› Use of tools for urban planning
› Conclusions and perspectives

Monday, Oct. 23th

12h00 - 13h30	Lunch		
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Dynamic qualities of the Gibsonian 'visual world' adapted to the study of the urban form

Jacques Teller (University of Liège, Belgium)

Themes for the lectures:

› Urban landscapes: Challenges, Values and Reference documents (including a reference to the recent UNESCO Historic Urban Landscape Convention)
› Back to the roots: the urban form viewed as a dynamic process
› Towards an ecological approach of the visual perception of urban open spaces
› Isovist versus Spherical metrics: commonalities and differences
› From static (sky opening, regularity) to dynamic indicators (sky shape skeleton)
› The city as a system of places and open spaces

Introduction to 3D modeling

Mickaël Brasebin (IGN, LaSTIG/COGIT)

During this thematic school, different methods based on computer analysis. In order to perform such methods, 3D digital city models are essential. Lots of different processes exist to produce such 3D city models. They are stored into different formats and different levels of quality. Thus, territories are generally not covered homogeneously by one type of very detailed 3D data and practitioners have to adapt their methods according to the availability of 3D in order to suit with the targeted analysis. The aim of this course is to present an introduction about the 3D city model and to offer a discussion about the influence of data quality on visual analysis.

Themes for the lectures:

› Overview of 3D data acquisition and reconstruction (image, LIDAR, manual, ...)
› Methods to model 3D geometries (B-Rep, voxel, CSG, …)
› Standards to store 3D city models (CityGML, computer graphics standards, BIM, …)
› Data quality and influence for 3D analysis.

Tuesday, Oct. 24th

9h00 - 10h30	Linking landscape perception and planning regulation	C. Cassatella	Introduction to computer visibilities
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Linking landscape perception and planning regulation

Claudia Cassatella (Politecnico di Torino, Italy)

The protection of landscape scenery dates back more than a century in Western Countries. The control of view cones is the most common tool. While the methods for analysing and assessing the views have been continuously improved, the related regulatory measures are still quite rough. A review of examples from Europe, US and Asia gives arguments for discussing the relation among visibility analysis and its actual use in the spatial planning field.

The aim of this lecture is to critically discuss limits and potential of visibility analysis, when related to public policies, such as urban planning or heritage preservation. The ever-growing possibility of controlling spatial features and of foreseeing spatial transformations can improve decision making processes. Nevertheless, existing techniques are often expert-based, as a consequence, participatory approaches must be introduced for ensuring a better representation of people's perception. Some examples will be proposed, and an open discussion will be structured for stimulating ideas.

Course plan:

› Introduction. Why do we care for vistas? Why should we? The protection of landscape scenery in public policies, the heritage-based approach. Some basic but ambiguous concepts: landscape, scenery, perception, as they are intended in the field of spatial policies and planning.

› International review on methods for protecting and managing scenic vistas and features. Examples from Europe, America and Asia of legislative and planning tools; levels ad scales of application; guidelines and assessment procedures; regulative frameworks. The role of visual analysis and the emerging role of GIS-based techniques.

· Discussion: some limits and potential of existing techniques, with reference to the control of urban landscape transformation. Who does the "point of view" represent? A top-down and expert-based approach? Selective and elitist, or democratic and inclusive?

› Focus on an Italian experience of landscape planning. The Piedmont Region's Guidelines for the analysis, protection and enhancement of the scenic character of landscape: methodology, applications at landscape scale and in urban context, applications via participative processes.

· Discussion: How to improve or innovate existing systems of rules and decision-making, on the basis of the new techniques? To what extent visibility represent perception?

Designing the visible urban scene: tools and applications of visibility analysis in urban design

Eugenio Morello (Politecnico di Milano, Italy)

Themes for the lectures:

› Visibility analysis for urban design purposes: Linking visibility analysis indicators and urban design values in assessing and designing open spaces

› Simplified visibility analysis tools for urban design using 2.5D digital surfaces models.

Exploring the skyline with GIS

Steffen Nijhuis (TU Delft, The Nederlands)

This lecture aims to introduce theories, methods and applications of GIS (Geographic Information Systems) in tall building visibility research. The central question to be addressed: How to get a grip on visibility of tall buildings in the landscape while exploiting the modelling, analytical and visualization capacities of GIS from the perspective of urban planning and design?

Themes for the lectures:

- Visual landscape research and visibility of tall buildings: integrating concepts of landscape planning, design and management; landscape perception approaches; GIS-based methods and techniques;
- Paradigms: expert, psychophysical, psychological and phenomenological approaches;
- Concepts of visual perception: perceptual characteristics that determine the visual range of tall structures in the landscape (field and range of vision, angular size, shape and vertical area, curvature of the earth, contrast between an object and its background, luminance, atmospheric conditions);
- GIS as tool in skyline research: GIS-based modelling, analysis and visualization;
- Digital landscape models: data acquisition, pre-processing and model construction;
- GIS-based visibility analysis: methods and techniques (grid cell analysis, landscape metrics, isovists, virtual 3D-landscapes, viewshed);
- Aspects of visual representation and communication;
- Examples: some applications of GIS in tall building visibility research;
- Outlook.

Objectification of the material dimension of the skyline: iterative design between geographers and computer scientists

Manuel Appert (EVS, University of Lyon 2, France) and Gilles Gesquière (LIRIS, University of Lyon 2, France)

The objectification of the skyline's materiality stem from overall reflection based on working group composed of EVS and LIRIS labs regarding the measure of skyline visibility. This question is rather different, from the epistemological [*] point of view, to the skyline's representation issues handled in the context of the ANR Skyline research project. Nevertheless, there are both designed to complement themselves, in so far as modeling skyline in 3D simulations helps to formalize components of skyline, and to develop decision-making tools useful to urban stakeholders.

The courses aim to present an approach targeted to produce an assessment support tool of skyline visibilities in urbanism. It is the produce of a collaboration of researchers from EVS and LIRIS labs in the ANR Skyline project. To characterize visual impact of buildings on skyline was one of the project expectations, before developing more complex technical analyses such as 3D visualizations. According to researchers and colleagues involved, this proposal is supplementary to a reflection on skylines' meaning through the focus on objects' visibility likelihood (thus partly on their perception) in the material skyline.

One task was dedicated to the producing of tools dedicated to the measure of urban shape so as to bring new means in decision-making process. The limits of existing tools and methods to assess the visibility of project (mainly 2D and dedicated to physical aspects - setting semantic informations aside) prevent fine qualification of urban projects in terms of visual impact. The objective here is to benefit from the potential provided by 3D geospatial datasets. Their production and supply increase indeed a lot since few years. Moreover, they are nowadays ever more delivered via OpenData initiatives. Powerful software tools allow to handle 3D datasets on wide areas and to produce, more detailed, spatial and semantic analyses. These analyses foster better understanding of the visual impact of towers on the skyline. The methods have been developed by a group of

geographers (Manuel Appert & Florence Jacquinod) and computer scientists (Gilles Gesquière, Cyril Briquet, Frédéric Pédrinis) in a multidisciplinary perspective. They allow today to put forward analysis tools able to tackle the terrain model, but also several layers such as buildings, vegetation, and rivers, over areas of several hundred square kilometers [**]. These new tools supplement the skills and know-hows of geographers, landscapers, and urban planners regarding the assessment of the visibility of urban projects includings towers. Thus, they give the possibility to consider multiscale and multicriteria approaches, mobilizing 2-dimensional cadastral and socioeconomic databases.

Thanks to the use of 3D mock-up of Lyon Metropolis, we are indeed able to precise the measure the skyline and the corresponding generation site (Appert, 2016). The process continues refining measures provided on Paris (by APUR), Rotterdam (Nijhuis et al., 2011), and Turin (Cassatella, 2013). The accurate shape of buildings and vegetation is integrated, and several new indices are produced. Due to the huge volume of data to process, only the supervised classification of vantage points and of items constituting the visualscape is nowadays possible. The mid-term objective is to assess global covisibility in each punctual position.

[*] Tasks related to the skyline visualisation involve almost exclusively the material and concrete dimensions of the landscape. Thus they enroll in lineage of approaches proposed by S. Rimbert (1973), targeting at understanding tangible part of landscape and at formalizing it in system, but also at considering landscape as an analysis tool.
[**] 3D mock-ups of Lyon Metropolis cover more than 550 km^2 but they do not consider 3D vegetation items. These items have been calculated (thanks to the cross-matching of orthophotographic, vectorial, and LiDaR datasets) and added for each districts of Lyon.

Wednesday, Oct. 25th

9h00 - 10h30	Surrounding facades, morphological signatures - tools available to spaces designers	T. Leduc	Analytical methods
11h00 - 12h30	Seen or not (already) seen	V. Signorelli	Analytical methods
12h30 - 13h30	Lunch		
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16h30 - 18h30	Multiple Fabric Assessment (MFA) - Geo-processing Analysis of Urban Fabrics in a Metropolitan Area.	G. Fusco	Analytical methods
19h00 - 20h30	Dinner		
21h00 - 22h00	Seing in colors	D. Siret	Utility and Usability

Surrounding facades, morphological signatures - tools available to spaces designers

Thomas Leduc (AAU-CRENAU, Nantes, France)

Visibility analysis of urban space is a powerful conceptual method that allows the understanding and the qualification of open urban space. In the horizontal plane, as in volume, with a discrete or a continuous approach, a systematic analysis of pedestrian viewshed not only allows a characteristic signature of the shape of surrounding facades or of the skyline, but also to partition the space in stable morphological units in terms of visual information and even to constraint buildable hull according to environmental criterion.

Themes for the lectures:

› Analysis in the horizontal plane (Panoptic or constrained isovist 2D, morphometric indicators, morphologic signature).

› Analysis in volume (3D isovist, map seen from the sky, morphometric indicators, morphologic signature)

› Field-oriented approaches (surfacic or linear, 2D and 3D signatures, thematic cartography).

› Tools dedicated to urban space designer (frequency analysis and homologous signatures, convex partition and ponderation, inverse methods and solar envelopes, etc.)

Seen or not (already) seen

Valerio Signorelli (CASA, UCL, United Kingdom)

Digital representations of the urban environment are nowadays essential supports employed upon throughout the urban design process. Their uses span from the conceptual visualisation of future urban scenarios, the analysis of various urban issues, as well as effective means/supports for triggering co-design activities and the public consultation processes.
The improvements in information and communication technologies have introduced new tools to handle these digital representations, solutions that in some case belong to disciplines not closely related to the urban practices. The course focuses on the uses of game engine technologies as means to provide real time, interactive and immersive visualisations, and analyses, of the urban environments in order to consider the digital representations of the urban environment as a responsive platforms.The duality among the "Vu pas (encore) vu" will be the underlying theme: on the one hand, to develop a 2D/3D isovist tool, on the other hand, to test, through the virtual reality devices, what it cannot be seen yet.

Themes for the lectures:

› Introduction to game engine technologies and virtual reality devices: role, uses, limits and potentialities in urban practices;

› 3D model as a dynamic and responsive platform. The ViLo project, an "ubiquitous" model and the real time data;

› Game engine technologies and visibility analysis, beyond the visualisation.

Quantifying the perception of density

Dafna Fisher-Gewirtzman (Technion – IIT, Israel)

The wellbeing of inhabitants in an urban setting is central concern in the dense urban context for both current and future cities. A sense of crowdedness may greatly influence the public's physical and mental health. Urban centers attract a large concentration of pedestrians and the perception of crowdedness may affect human comfort and their quality of life.

Urban morphology influences the visual perception: Walking in the center of a broad boulevard shaded with trees, surrounded by low buildings would be perceived differently than walking along a sidewalk adjacent to towers; living on the second floor, overlooking a narrow alley would be perceived differently than having a magnificent view on the 40th floor. These examples are intuitively very easily evaluated.

The 3D LOS visibility analysis model was proven to reinforce the comparative perceived density of variant urban and architecture morphologies. The model is simulating the human visual perception either from specific viewpoints from buildings facades or while in movement along pedestrian paths. It masters the challenges offered by the complexity of dense urban environments in private and public spaces.

This model was assessed by way of extensive experiments in a visualization lab where participants were immersed in virtual reality environments. The model allows for variations to be examined with different parameters inserted by the user. It provides both of 'static' visibility analysis, from specific viewpoints and analysis of a dynamic movement in the city. This 3D visibility model can become an essential tool in the planning and design process of public and private spaces for existing and future cities.

Themes for the lectures:

› Is perception quantifiable? Visibility analysis as evaluation tool for urban environments

› 3D visibility analysis models: Voxels vs. Lines Of Sight; quantity and quality

› Simulating inhabitants' perceived density in the city; private and public spaces

› Simulating visual perception (in movement) along pedestrian-paths in the city

› Comparative analysis for existing or planned designs:

· alternative apartment locations in an urban block

· alternative urban configurations and urban typologies

· alternative urban pedestrian paths and public spaces

· Variant urban uses: can visibility of urban uses predict pedestrian behavior?

› Model assessment - experiments in Virtual Reality in a visualization lab vs. study in real environment.

Multiple Fabric Assessment (MFA) - Geo-processing Analysis of Urban Fabrics in a Metropolitan Area

Giovanni Fusco (UMR Espace, University Nice Sophia Antipolis, France)

Urban fabric is a fundamental small-scale component of urban form with important relations to social, economic or environmental phenomena. It is the result of interplay between buildings, parcels and street segments. Nevertheless, its quantitative analysis has been so far limited either in space extension or in the components analyzed. The planning approach has privileged aerial rather than pedestrian point of view. Multiple Fabric Assessment (MFA) is a new methodology developed by geographers at UMR ESPACE for the recognition and characterization of urban fabric tackling these issues through the use of multi-step geo-processing. The aim of my intervention is to expose the theoretic principles, the methodology and the practical aspects of MFA, and to discuss together the feedback from the first case studies where MFA was employed.

Themes for the lectures:

› Urban fabrics: overview of definitions, concepts and classical analysis approaches.

› State of the art of the analysis of urban fabrics through geo-processing.

› Principles of the MFA approach: integrating the pedestrian's point of view, the inductive approach, the metropolitan scale.

› Methods of the MFA approach: definition of the spatial units, calculus of morphological indicators in a GIS platform, geostatistical analysis, Baye sian clustering.

› Operationalization of the MFA approach: data and software requirements, algorithm parametrization, results validation.

› Case-study feedback for the MFA approach: application to the analysis of urban fabrics in the French Riviera cities.

Seeing in colors

Daniel Siret (AAU, ENSA Nantes, France)

This presentation will be based on the PhD thesis of Anne Petit defended in Nantes in 2015, under the supervision of Daniel Siret and Nathalie Simonnot. The thesis has been initiated by the observation that new urban environments display more and more flashy and unusual colours. There is a lack of knowledge on the effects of such polychromatic expressions on our perception of space and urban landscape. Besides, there are very few methods to consider expressive colours in urban design, although the analysis of the colour planning strategies shows the need to establish chromatic indications upstream of the projects.

To consider the multiple colour variations under the light, climate and movement, Anne Petit's thesis proposes the concept of sensory chromatic effect. Based on a survey in the city of Nantes, a repertoire of about twenty chromatic effects has been defined in several categories (effects on optical field, effects linked to climate and light, psychomotor effects, effects on space and form, semantic effects). Graphic representations using digital imaging tools have been proposed to handle these effects in the context of an urban or architectural project.

The course will provide:

> An introduction on the evolution of polychromatic urban developments and their regulation.

> A presentation of the notion of "chromatic effect" and its implementation through a case study in the city of Nantes in 2015.

> A time for discussion on the questions raised by the use of colours in urban design.

Thursday Oct. 26th

9h00 - 10h30	Experiments on the study zone
11h00 - 12h30	Experiments on the study zone
12h30 - 13h30	Lunch
14h00 - 16h00	Experiments on the study zone
16h30 - 18h30	Experiments on the study zone
19h00 - 20h30	Dinner
21h00 - 22h00	Presentation of the experiments results

Friday, Oct. 27th

9h00 - 10h30	Uses of visibility analysis and City Information Modelling	F. Jacquinod	Utility and Usability
11h00 - 12h30	Conclusion, perspectives and following steps	M. Brasebin T. Leduc	Conclusion to computed visibilities
12h30 - 13h30	Lunch		

Uses of visibility analysis and City Information Modelling

Florence Jacquinod (France)

Today, geo-digital technologies, including 3D modeling, are more and more used to support urban governance. The improvements, in terms of data acquisition and algorithms and methods dedicated to spatial analysis offer new perspectives to analyse urban environment. At the scale of the city, the use of 3D semantized geodata involves questioning about 3D data

modelling, processing of heterogeneous data sources, collaborative uses, but also about interoperability. The aim of this course is to compare and contrast the tools about visibility analysis and their results and the current uses of 3D City Information Modelling in order to understand how they may be integrated into operational process.

Themes for the lectures:

› Introduction to the 3D CIM and panorama of their uses

› Uses of landscape analysis in the context of urban planning : uses and non-uses of existing technologies and tools (diagnostic and possible evolutions)

› Collective discussions about the possible contributions of the tools mentioned during the course week.

Virtual machine in a nutshell

In order to allow the manipulation of the different methods presented this week and to ease the installation of the necessary softwares, a Virtual Machine is provided notably to be used during the workshop day.

How to install the virtual machine dedicated to the thematic school “See or being seen… or not 2017”?

A Virtual Machine (VM) is «an emulation of a computer system [...] based on computer architectures and provide functionality of a physical computer» (see Wikipedia).

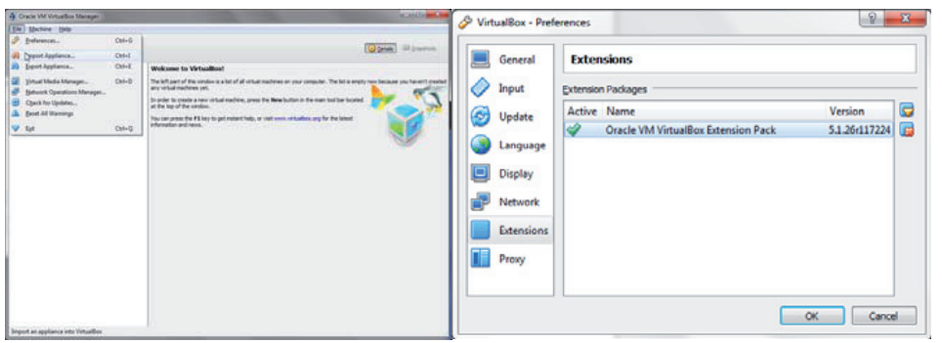
In the specific context of the thematic school “See or being seen… or not 2017”, the VM implementation (i.e. the Appliance) involves Windows 10 Operating System with several useful softwares already installed. Most of them are proprietary softwares, therefore we have decided to install and to use trial versions.

First of all: install VirtualBox 5.1.28

The installer is available on the hard disk provided by the organizers or on the web: *https://www.virtualbox.org/wiki/Downloads* you will find useful links to download the “right” runtime. Once you have download it, install it as usual. Please, pay attention to the version number (5.1.28 is mandatory!) and to your own computer architecture (Windows host, OS X host, Linux host).

Then install the VM VirtualBox Extension Pack

On the same webpage https://www.virtualbox.org/wiki/Downloads you will find the link to download the VM VirtualBox Extension Pack. Please download it on your own laptop and, then, through the VirtualBox preferences, add it as a new package in your extensions list.

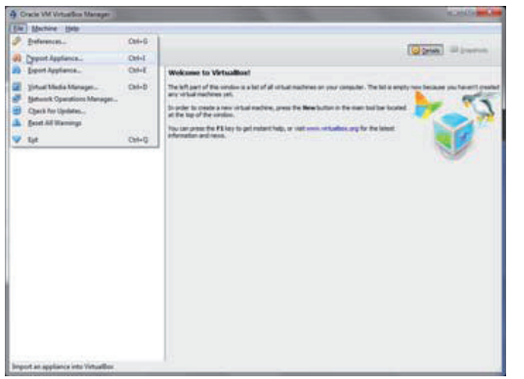


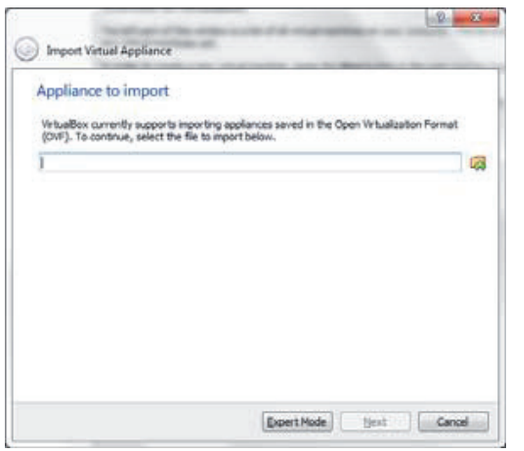
Download and import the appliance especially made for the thematic school

On *ftp://mbrasebin:these2014@ftp2.ign.fr/VM_Thematic_School_VF.ova* or on a hard-disk provided by the organisers, you will find a 30GB Appliance especially prepared for the thematic school. Please download it on your laptop’s disk! Once deployed, the virtual machine may use up to 60GB on your disk, so pay attention to the available space before the deploy. You can choose the directory where the machine virtual is deployed in the menu File > Parameters.

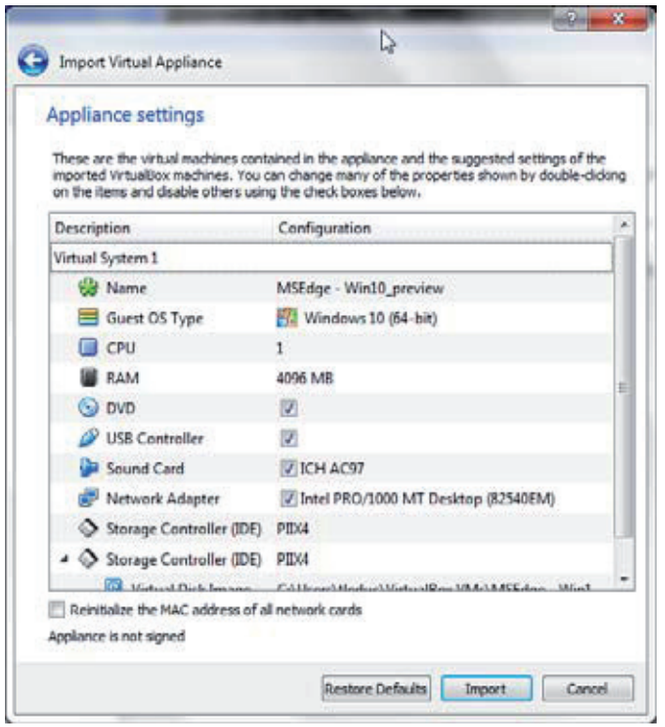
The virtual machine is in a 64-bit architecture, so check if your system respects this requirement.

Once downloaded, import it on VirtualBox Manager.





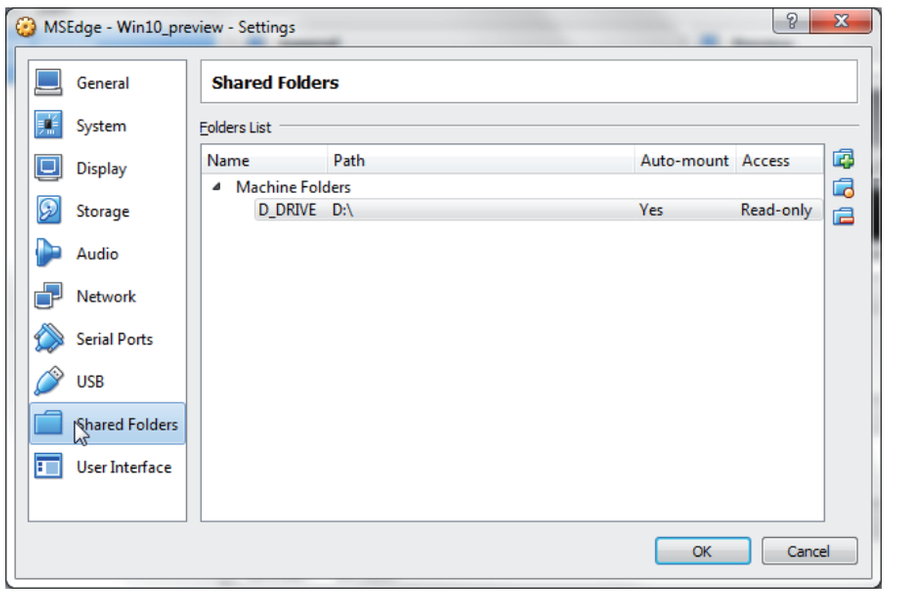
Before starting the Appliance import, VirtualBox Manager suggest some settings regarding the corresponding VM. Some properties may be changed by double-clicking on items.



Pay attention, importing such an Appliance is a heavy process (5 min. at least!)

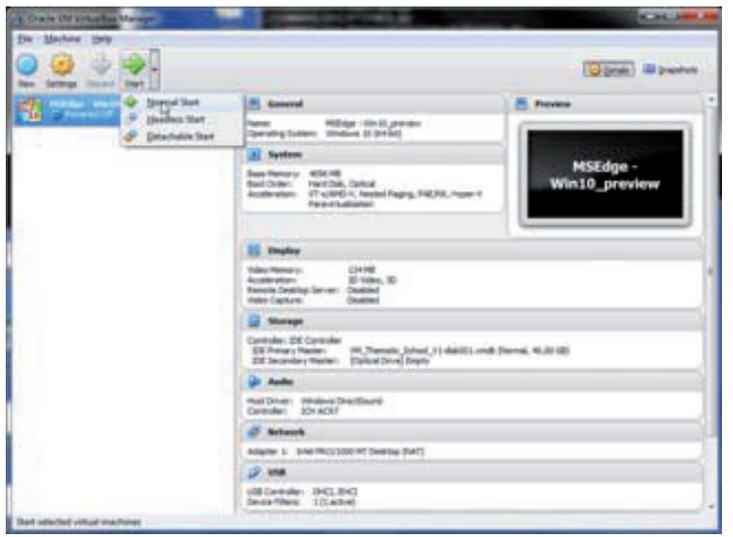
You can update the computer resources used by the virtual machine by a right click > configuration. In the system menu, you may set the RAM (4 Go for an optimal use) and the number of processors.

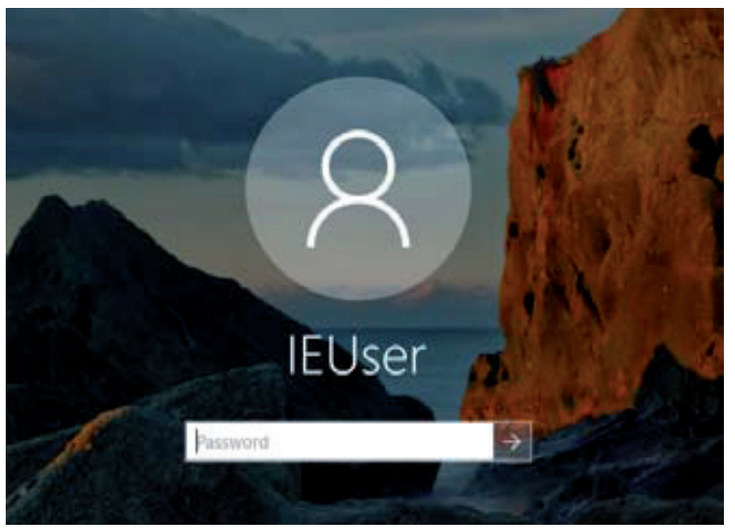
In the configuration menu, with the 'shared folders' feature of VirtualBox, you can access files of your host system from within the guest system. This is similar how you would use network shares in Windows networks -- except that shared folders do not need require networking" (see VirtualBox Help).



Start the VM

To start the Appliance double-click on the corresponding entry in the list within the VirtualBox Manager (or select the entry and press the “Start” button at the top!).

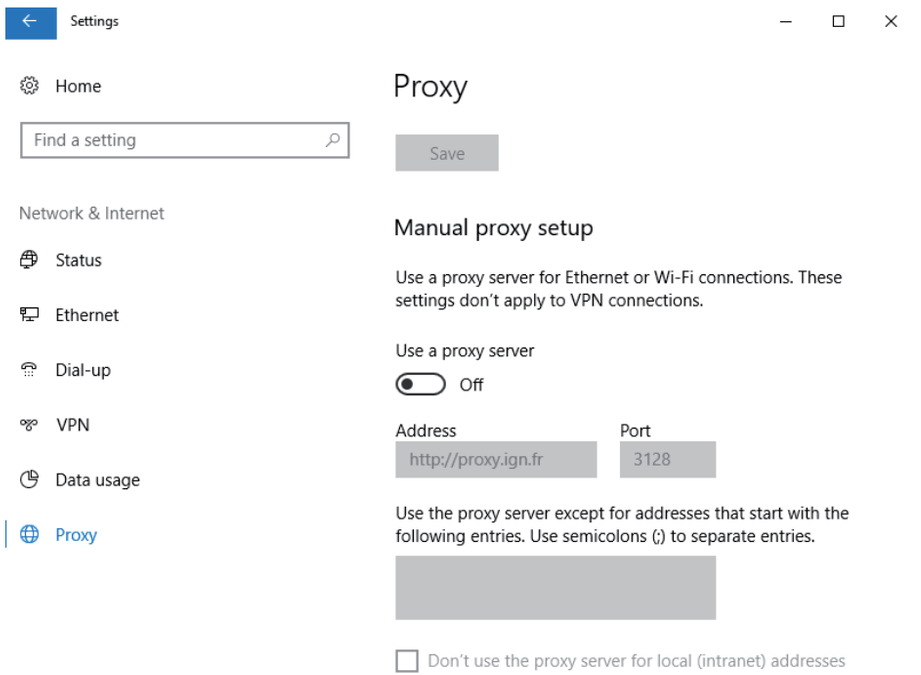




Login user name: **IEUser**

Login password: **Passw0rd!** (with a zero as 6th character - this password is shared by all softwares installed on the Appliance)

If needed, to access the network, you may have to change the proxy settings inside the Virtual Box. In the search bar, type “Settings” and go inside the menu “Network and Internet” > Proxy. You will have to enter the required information in the window.



Softwares installed on the Appliance

Login: VuPasVu2017/password: PasswOrd!

> ArcGIS Desktop 10.5
  · ArcGIS 3D Analyst
  · ArcGIS Data Reviewer
  · ArcGIS Geostatistical Analyst
  · ArcGIS Network Analyst
  · ArcGIS Spatial Analyst
  · ArcGIS Workflow Manager
> QGIS 2.18
  · Viewshed Analysis
> Unity 2017.1.1f1
> JDK8
> Rhino 5
> Grasshopper_0.9.76.0
> SketchUp Make 2016
> t4su
> Firefox
> GMSH 3.0.5
> Blender 2.79 + BlenderGIS
> Matlab R2017a
> LibreOffice

Datasets available

Sources

In the VM, the datasets are available on the D repository of the virtual machine. You can access it through a shortcut on the desktop.

OpenData Lyon

The Lyon Metropole provides an important Open-Data platform *(https://data.grandlyon.com/)* that steams a large quantity of geographic datasets.

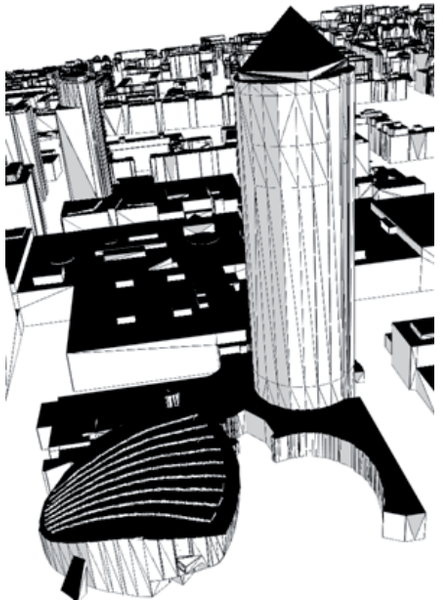
These datasets include 3D LOD2 geographic data (https://data.grandlyon.com/search/?Q=maquette+3D) cropped according to the different districts of the City in the CityGML format. The data are projected in a metric referentiel (RGF93 / CC46 - EPSG:3946) and are available at three dates : 2009, 2012 and 2015.

The data is composed by 5 different layers (where X is the number of the district) :

> Buildings (file LYON_XEME_BATI_2012.gml)
> Notable buildings (file LYON_XEME_BATI_REMARQUABLE_2012.gml) the buildings of interest of the city with very detailed geometries ;
> Notable bridges (file LYON_XEME_BATI_REMARQUABLE_2012.gml) :TIN (file LYON_XEME_TIN_2012.gml).
> Water (file LYON_XEME_WATER_2012.gml).

All the data are textured, but in order to limit the amount of used memory (and because they are not necessary), the textures are not used.

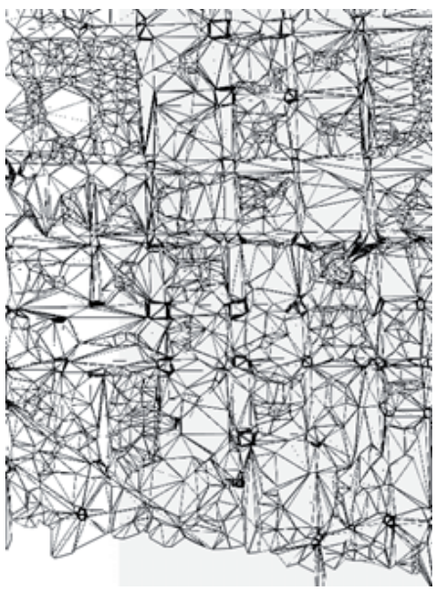
Only the TIN and the two building datasets will be used in this document.



Buildings are modeled at the LOD2 level of detail with separately their roof and wall surfaces. On the left, the 3D buildings are presented with black roof and white walls, on the right, the same buildings area is presented in a textured 3D mock-up provided by Société Publique Locale (SPL) Lyon Part-Dieu.

We can notice that buildings are not separated, an object in the building layer is equivalent to a urban islet.

The TIN is produced according to existing geographic feature as a set of triangles.

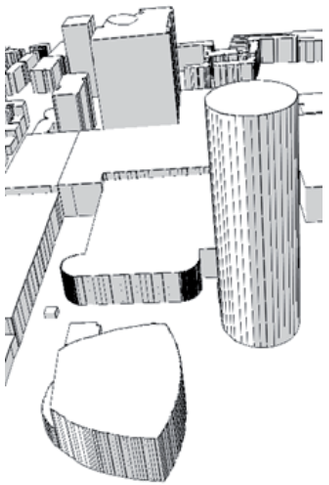


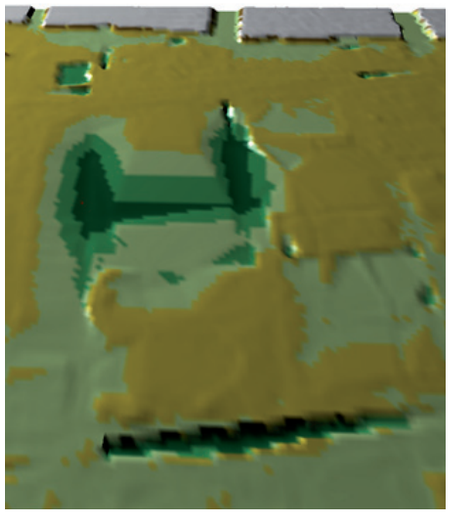
BD TOPO®

BD TOPO® *(http://professionnels.ign.fr/bdtopo)* is the 3D reference data on the whole French territory. The geometric accuracy of the data is metric. It describes the different themes of the topography (roads, terrain, buildings, …). The datasets are free for research or public service purposes. The projection system used is the Lambert 93 that is defined for the whole country (EPSG:2154).

The buildings are modelled as LOD 1 objects : the footprint is provided with a metric information about the height of the building.

The terrain is modelled through a grid DTM with a metric precision and a a 5m planimetric resolution.





Other objects are modelled in 3D such as vegetation or water surfaces as 3D surfaces and the road axis as 3D linestring.

Société Publique Locale (SPL) Lyon Part-Dieu

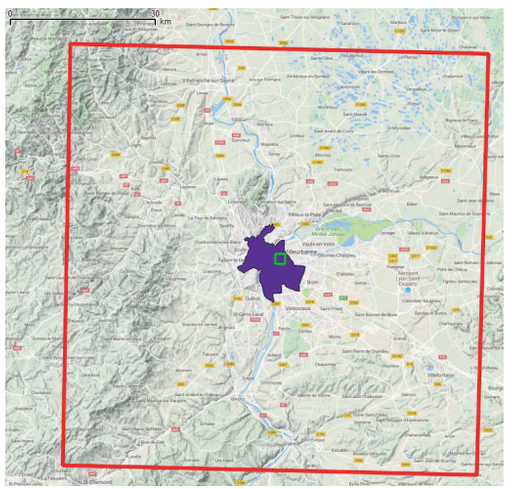
A 3D SketchUp mock-up of a region of interest of about 1kmx2km around the Lyon Part-Dieu railway station has been provided by SPL Lyon Part-Dieu. In this mock-up, textured buildings are modelled with a LoD2 Level of Detail, and rest on the textured digital terrain model (TIN). This dataset seems to be directly derived from the OpenData.

Study zone

Two study zones are defined in order to explore different aspects of 3D visibility analysis located in Lyon Metropole.

Position of Lyon Metropole in the French territory

› Large area



The large area is generated as a square, which sides measure 60 km, centered on Lyon Metropole. It may be used for global analysis. On this zone, BD TOPO® datasets in the EPSG:2154 projection are available :

› Buildings (buildings.shp)

› Roads (roads.shp)

› Wetlands (wetlands.shp)

› Terrain (dem.tif or dem.asc)

› Woodland (woodlands.shp)

› Lyon Part-Dieu

This area is delimited by a square, which sides measure 1km x 2 km, near the Lyon Part-Dieu train station. This district is of interest because it contains a dense urban fabric and is still evolution from the last decades. Data from OpenDataLyon (LOD2) and BD Topo (LOD1) are available on this zone.

OpenDataLyon

› CityGML Model, such as described before, is available for the third and sixth districts ("3e arrondissement" and "6e arrondissement" on the image) in EPSG:3946 projection.

Other data are preprocessed and available in the same EPSG (EPSG:2154) :

· LOD_BUILDING_2012.shp : contains the buildings of the CityGML dat set, cropped on the zone, and reprojected. Each feature, is a building with an ID, and represents one building from the CityGML file. This data is also available for 2009 and 2015.

· LOD_BUILDING_separate_2012.shp : contains the buildings of the CityGML dataset, cropped on the zone, and reprojected. For this layer, the different surfaces of each buildings are separated into different features with a type attribute that varies if the surface is a wall (value W) or a roof (value R). This data is also available for 2009 and 2015.

· tree.shp : it contains the position of the center of the trees on the zone. Several attributes are available such as the height (hauteurtot attribute), the diameter (diametreco attribute) and the specie in Latine (essence attribute)

· Tin.obj and tin.shp : they represent the relief in both format.

These data are also available in the webmercator projection (EPSG:3857) to be represented on a virtual globe.

BD TOPO®

Data from BDTopo are available in the same EPSG (EPSG:2154) :

› Buildings.shp

› Road.shp

› dem.asc

Complementary data

› This folder contins extra data necessary to the workshop day (itinaries and view points of interest).

List of known errors

› VTX not found:

· You need to enable virtualization in the BIOS settings.

› To benefit from USB key within Linux, please add the current user to the «vboxusers» group.

· sudo usermod -a -G vboxusers $USER (+ restart the current session).

› 3D Driver are not enabled in Blender:

· Follow these instructions: *https://blender.stackexchange.com/questions/60236/blender-cant-detect-3d-hardware-accelerated-driver*

Notes

Notes

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CNRS thematic School 2017

October 23rd-27th 2017

Saint-Paul-En-Jarez - France

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