



# **3D A VIRTUAL ENVIRONMENT INSPIRED OF VIDEO GAMES**

***First International Conference on Driver  
Distraction and Inattention***

**Gérald Foliot (Author)**

***Institut des Sciences de l'Homme / Pôle Ressources  
Informatiques, CNRS – UMS 1798***

**Chantal Combe-Pangaud (Author)**

***Université Lyon 2, LEACM/CRIS – EA 647***

**Armelle Jacquet-Andrieu (Translation & Presentation)**

***Université Paris Est – UMR CNRS 8049***

# Research Teams & Technical Research Teams



## **LEACM/CRIS – Université Lyon 1**

Robert Martin (Leader of the AR5)

Armelle Jacquet-Andrieu

Annick Maincent

Chantal Combe-Pangaud

## **INRETS/LESCOT**

Alexandra Fort



## **MMB – Institut des Nanotechnologies de Laboratoire de Physique de la Matière – INSA, Lyon**

Christian Collet

André Dittmar

Claudine Gehin



## **Pôle de Ressources Informatiques (PRI) Institut des Sciences de l'Homme – Lyon**

Gérald Foliot

Didier Leblanc

Nicolas El-Sayegh

## **CERMEP/MEG – Lyon**

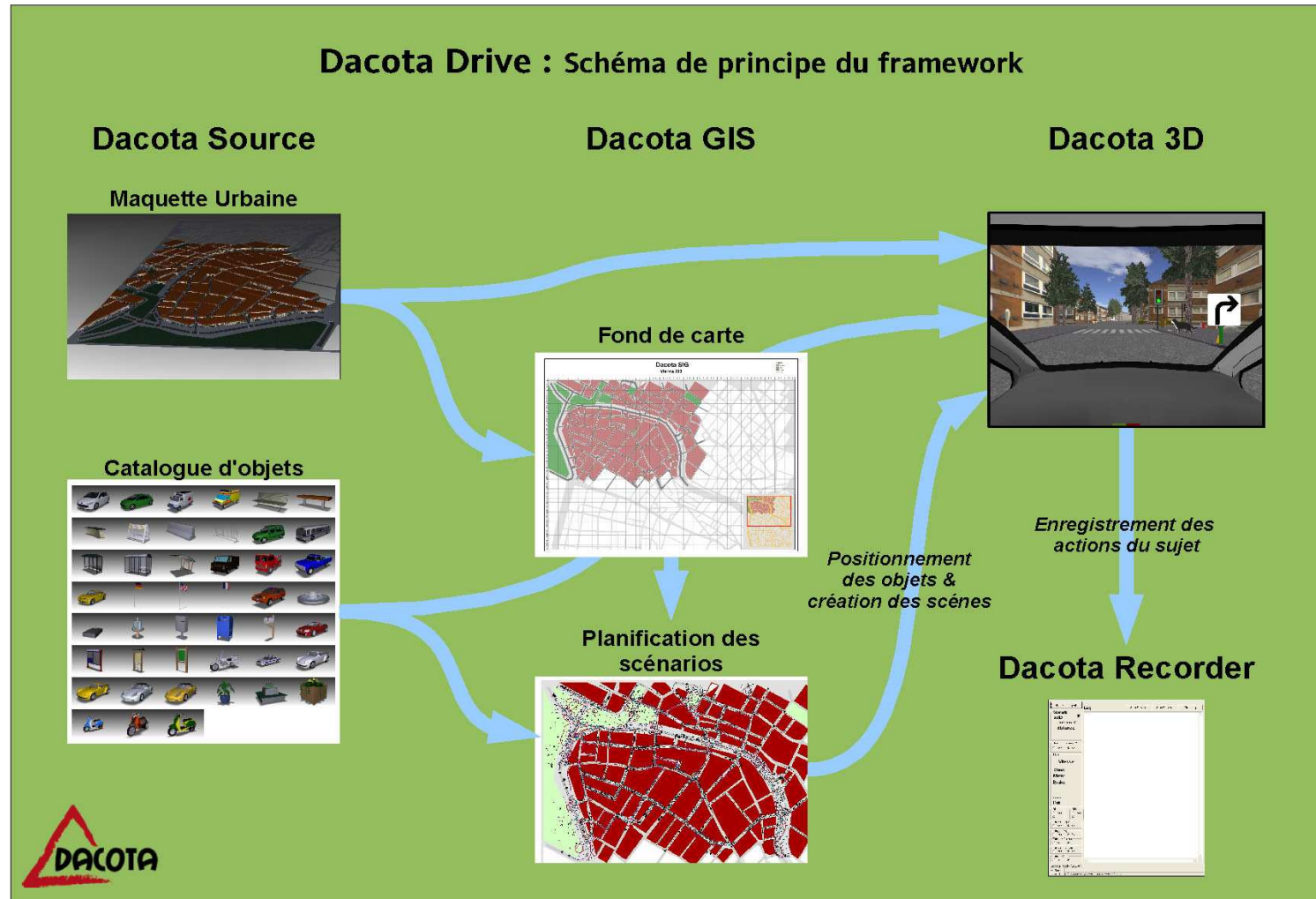
Claude Delpuech

Sébastien Daligault

Françoise Lecaiguard

Alexandra Fort

# Synopsis of DACOTA 3D Environment





# 1. Presentation (1/2)

- This **3D environnement** is a construction of the *Pôle de Ressource informatique (PRI)* of the *Institut des Sciences de l'Homme*, Lyon (France)
- *Unity 3D System* is a recent high performement Game-Engine, choised for **DACOTA 3D**.
- **It is multi platform**: Mac, PC, Web, iPhone, Wii
- **Easely used**
- **A programmation in real time**
- **Different langages** (C++, javascript, C#, etc.).
- This ***Urban modelling*** is inspired of a Michael Wimmer's & Peter Wonka's work (1998-2003, "*Real-time Rendering of Urban Environments*").

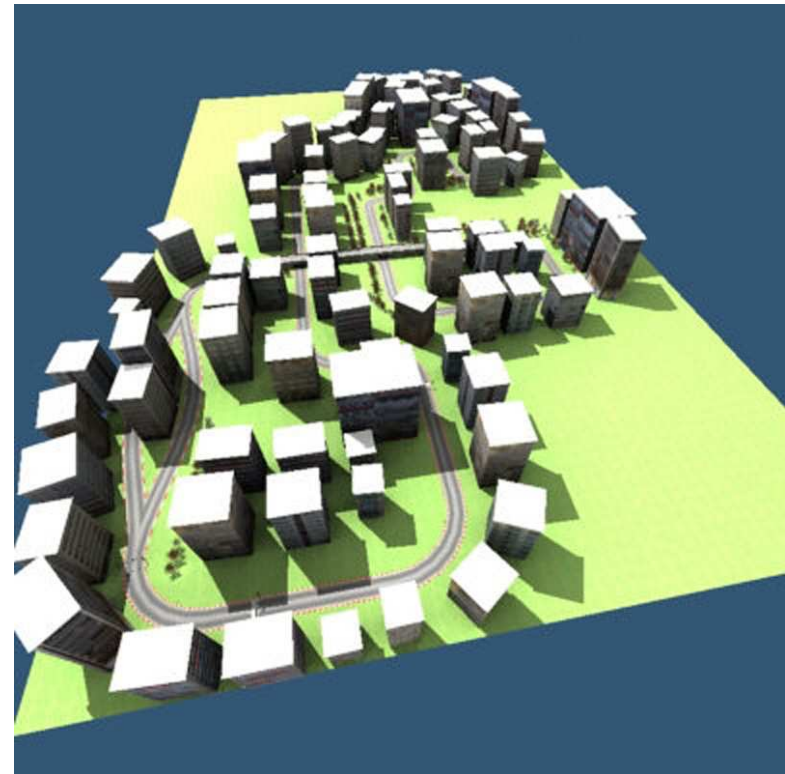


# 1. Presentation (2/2)

- This modelling is a 2 km/2 km area of Vienna (Austria). The system has divers components:  
1) **Spacial analysis system** (elaboration of a raid); 2) **Generative system** (grammar), for elaboration of edifices).
- **Urban Modelling Group** have developped this model in the *Institut de Recherche en sciences et techniques de la ville*.
- Definition of the **scenarii** for the circulation of the subject in the **3D space**
- Gestion des **scenarii**: realisation with un **GIS (Geographic Information System)**.

## 2. How Modeling a Urban 3D Environment? (1/2)

- *Kind of town*
- *a) Trip-Town*

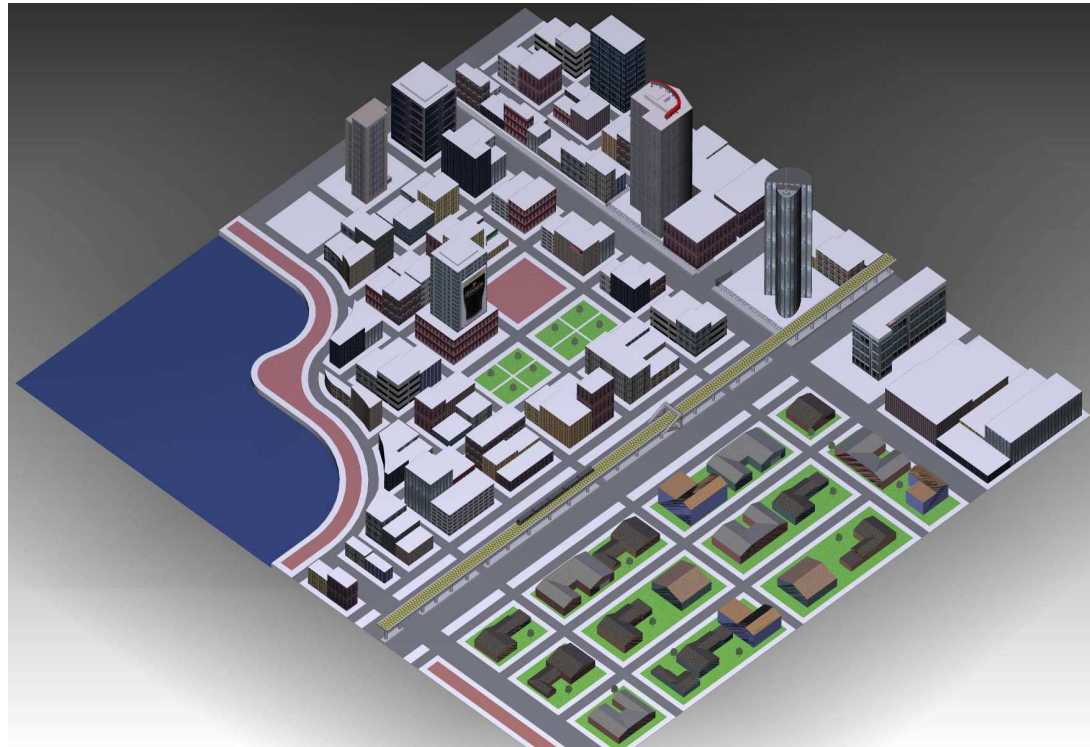


*A HalukTorun / Turbo Squid picture*



## 2. How Modeling a Urban 3D Environment? (2/2)

*b) Geometrical town*



*A HalukTorun / Turbo Squid picture*

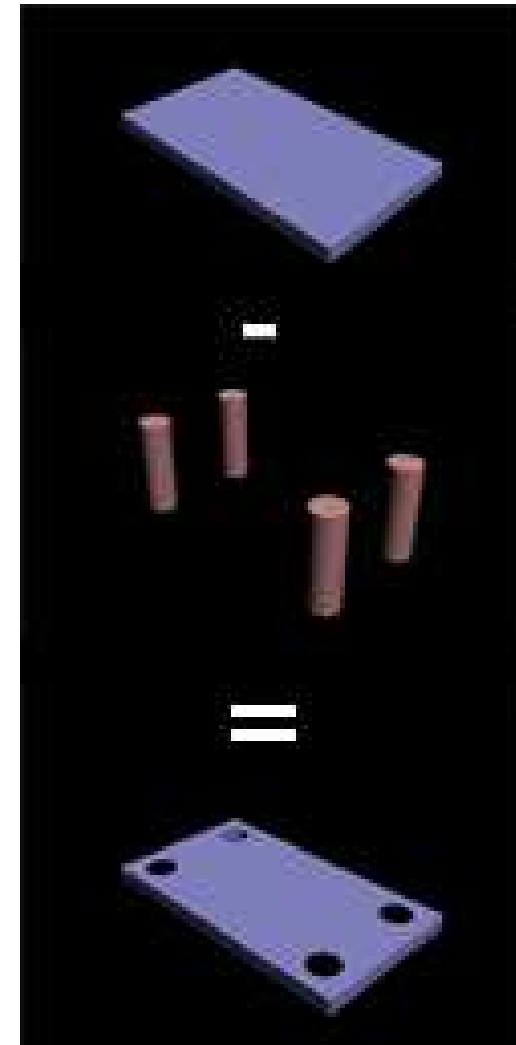
### 3. Kind of construction (1/4)

#### a) Procedural System

Plate\_with\_4\_holes = 1 rectangle parallelepiped\_4  
cylinders

#### b) Space analysis

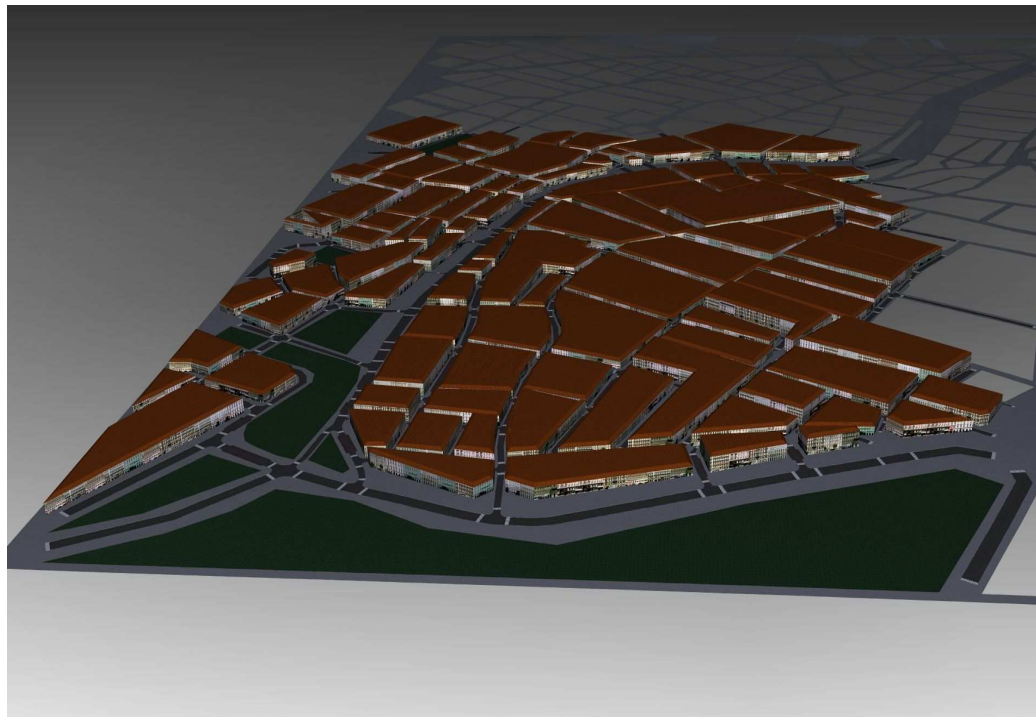
- Numeric Representation of the Topography (NRT), altimetry
- Numeric Production Model (NPM)
- Areas Extraction with the two models NRT & NPM
- Specification of objects
- Generative grammar similar as *L-System* (construction of the buildings)





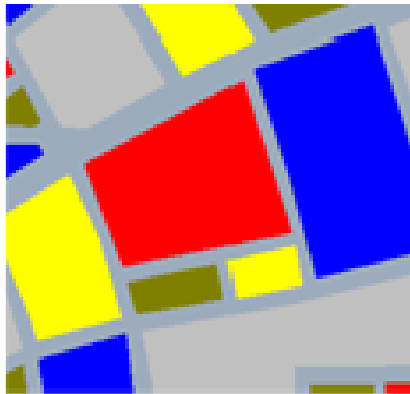
### 3. Kind of construction (2/4)

- **DACOTA 3D environment** is a urban model (cf. Michael Wimmer & Peter Wonka (1998-2003, *Real-time Rendering of Urban Environments*))



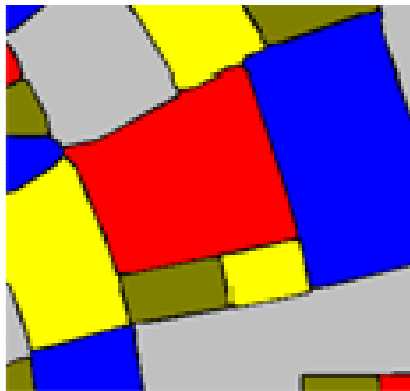
**VIENNA (AUSTRIA): a 2 km/2 km area.**

Gérald Foliot - PRI : ISH/UMS 1798 C.  
Combe-Pangaud Uyon2-LEACM/CRIS

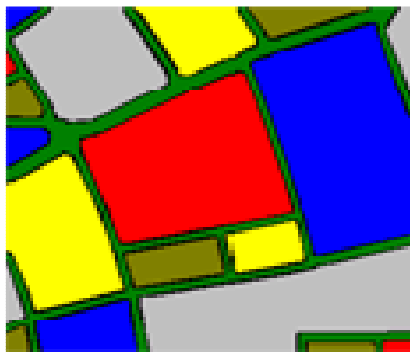


## 3D-Tabl. 1: Production of the urban fabric

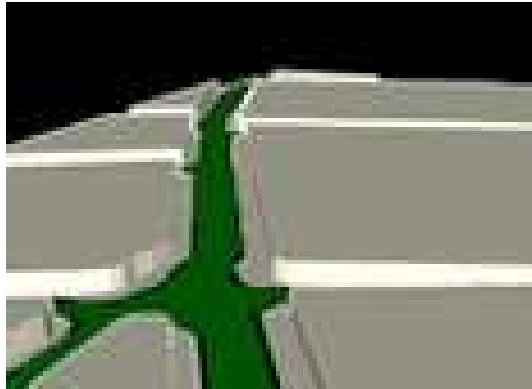
**Stage 1: *Building Imprint on the ground***



**Stage 2: *Trunk roads Production***

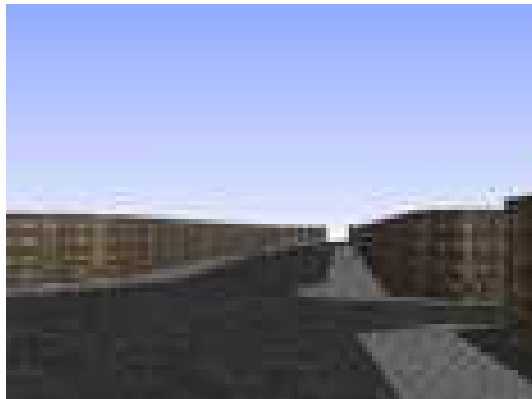


**Stag 3: Urban motorways Production**

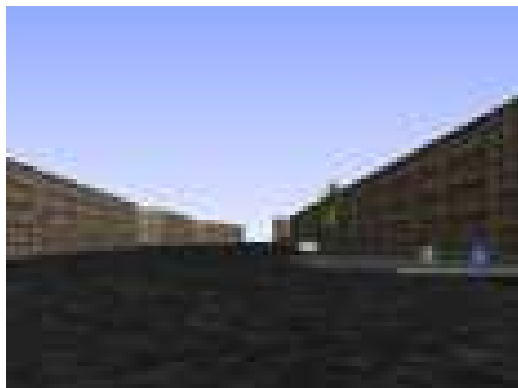


## **3D-Tabl. 1: *Production of the urban fabric***

### **Stage 4: *3D Extrusion***



### **Stage 5: *2D Adjustment***



### **Stage 6: *Putting on the 3D objects***

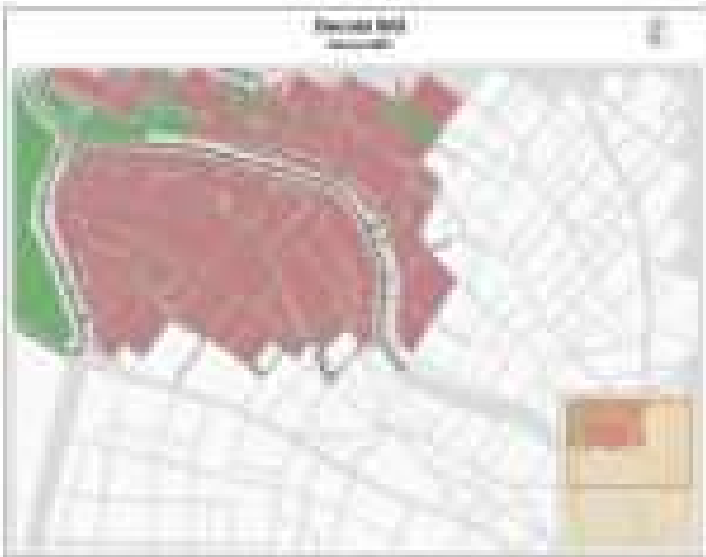
## 4. Managing of the *scenarii*

### Mapping of the Scenario

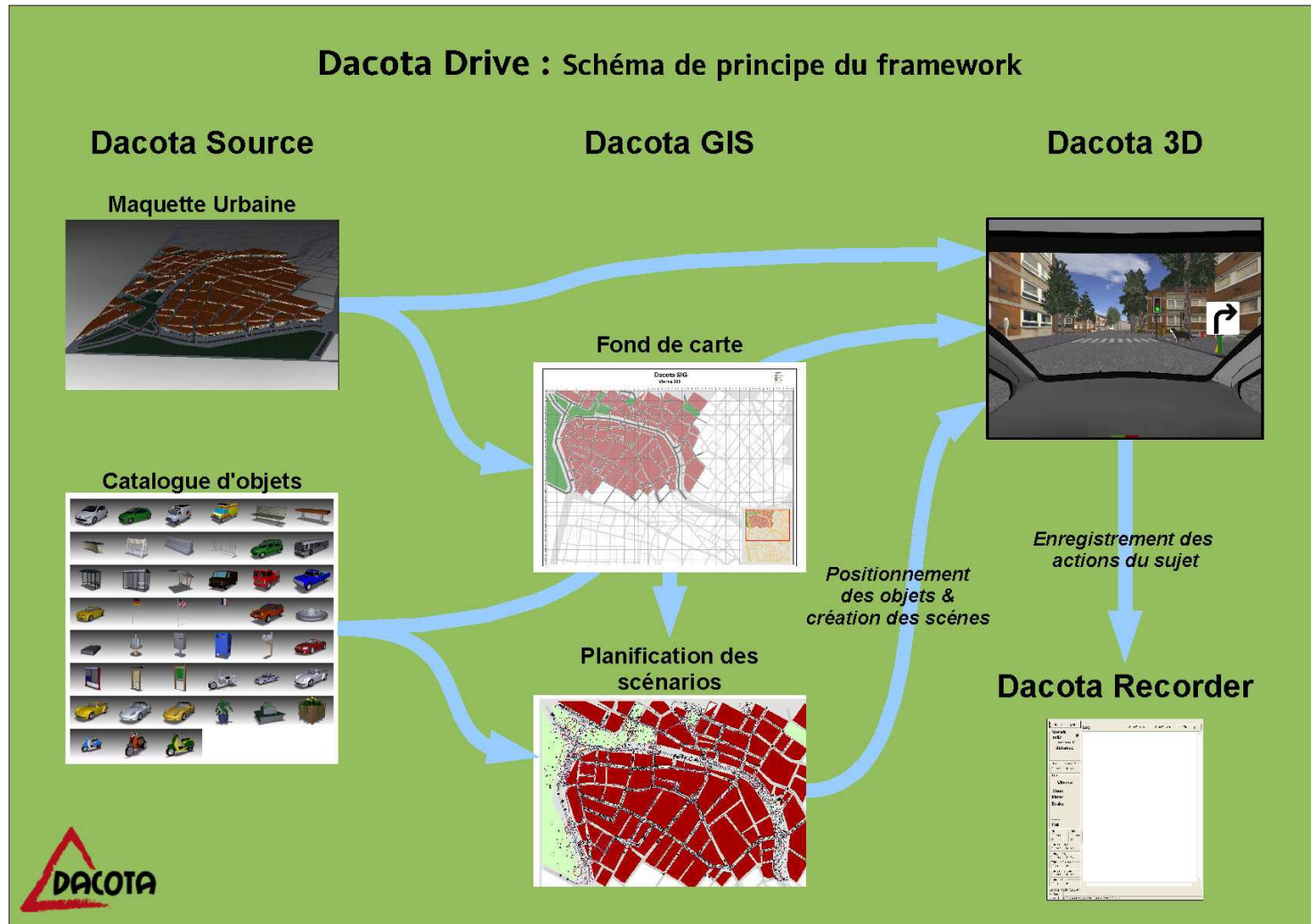
**Road signals:** traffic lights, direction indicators...

**Urban objects:** vehicles, traffic sign,...

**Events:** irruption of 2 balls on the road, of 2 pedestrians crossing the road...



## 5. Finally: *Synoptis*





## 6. *Conclusion*

- **Why this kind of 3D environment?**
- The subject doesn't recognise spacial specific sign on the driving scenario because we have to avoid the **learning effect** in the **MEG analysis** which requires an important replication (50×) to be accurated.

# Thank you for your attention



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