AUGMENTED REALITY TUTORIAL
**by Gilles TARNUS**

1- INTRODUCTION :
What is Augmented Reality (AR) ? go to http://en.wikipedia.org/wiki/Augmented_reality
To resume : the augmented reality is a term for a live direct or indirect view of a physical real-world environment whose elements are merged with (or augmented by) virtual computer-generated imagery

In this tutorial, you will learn, step by step te way to make an augmeneted reality 3D experience, you will start from a sketchup model (works whit lot of model's formats, thank to blender...)
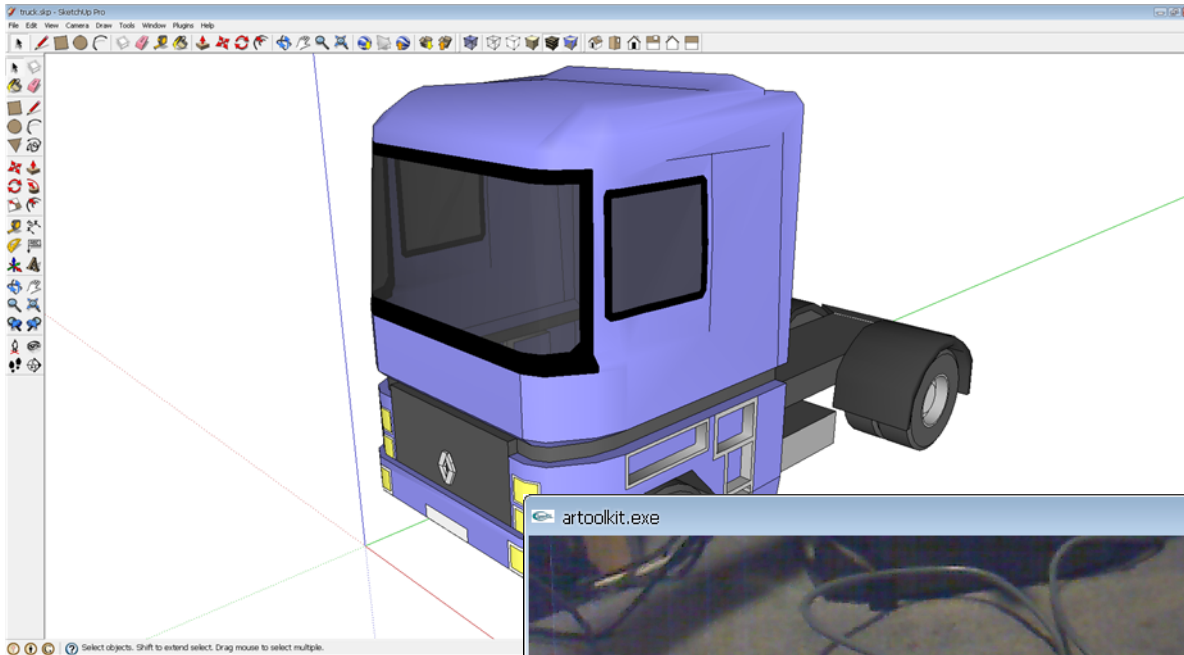
and finish by display the model in 3d augmented reality whit your web cam
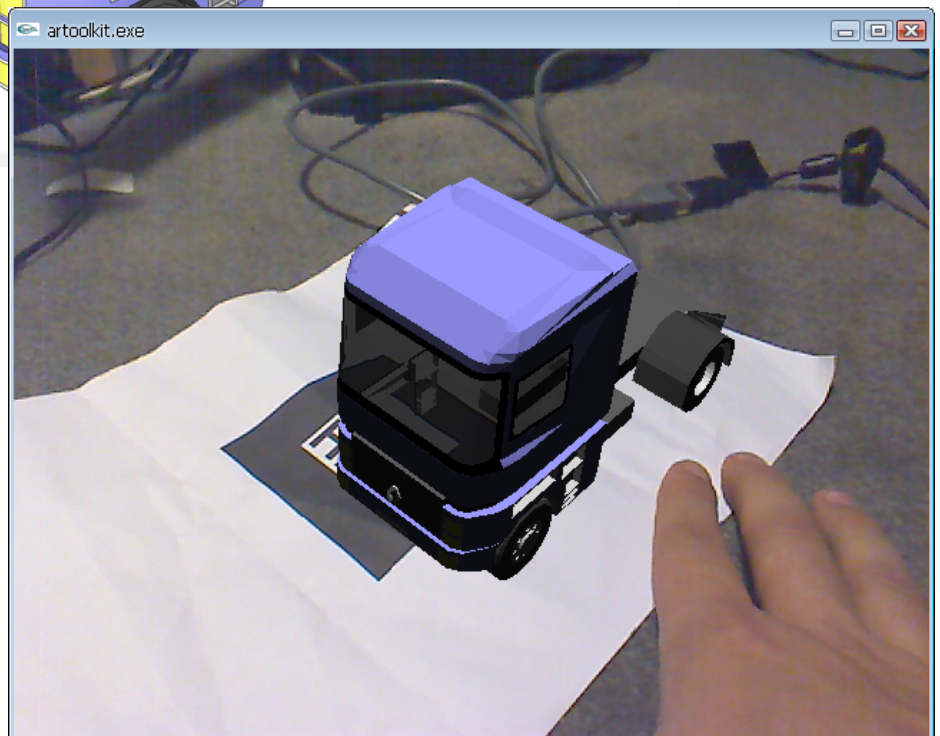
2- REQUIREMENT :

in this tutoial, you need :

- a functional brain
- a computer
- windows (but possible whit mac and linux)
- a web cam
- a printer and a A4 sheet (but not necessary, give you tip later)
- some free softwares :

> - Sketchup at http://sketchup.google.com/intl/en/
> - Python at http://www.python.org/download/
> - Blender at http://www.blender.org/download/get-blender/
> - Atomic Authoring tool at http://sourceforge.net/projects/atomic-project/files/

Beware : all this softwares are free for a personnal or educational use, not for commercial use

3- Download and installation :

Download and install by default (next,next ..., finish) lastest version of :

- Sketchup at http://sketchup.google.com/intl/en/
- Python at http://www.python.org/download/
- Blender at http://www.blender.org/download/get-blender/
- Atomic Authoring tool at http://sourceforge.net/projects/atomic-project/files/

in this order

4- Sketchup :

- open sketchup, and be sure "view => toolbar => getting started" is enabled.
- click on "get model" on browse the google 3d waehouse.
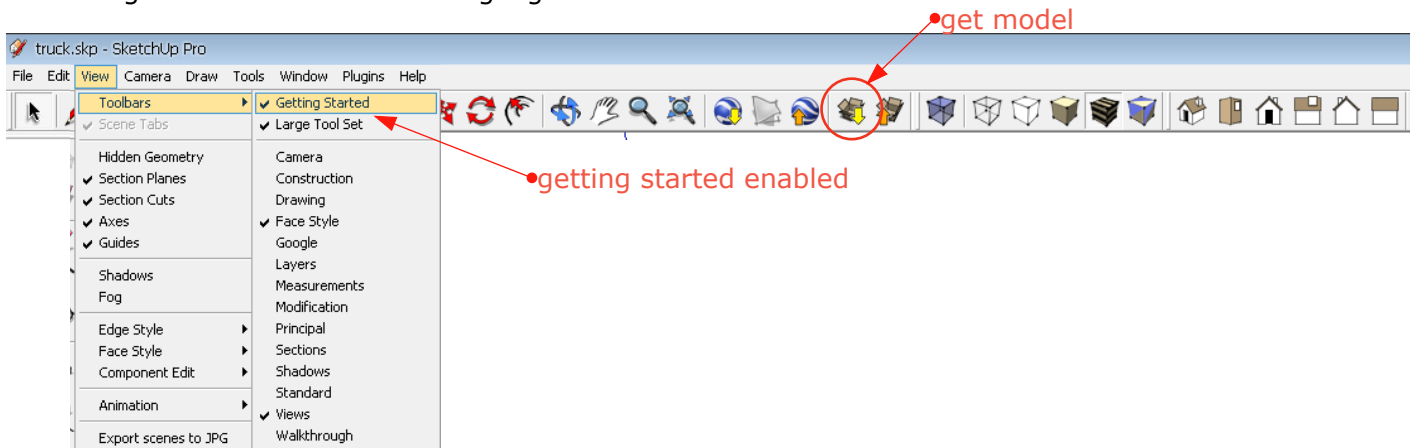
- search for a "good" model : type "truck for augmented reality tutorial" for example.
(by "good" i mean, a model whit front and rear faces whit the same material, only rgb material, no texture)
- download it directly in your sketchup model
- place the model
- save the model to "your documents/augmented reality/ truck.skp" for example
- in sketchup go to "file => export => export 3d"
- in the dialog box export the model in kmz format into into "your documents/augmented reality/ truck.kmz" for example
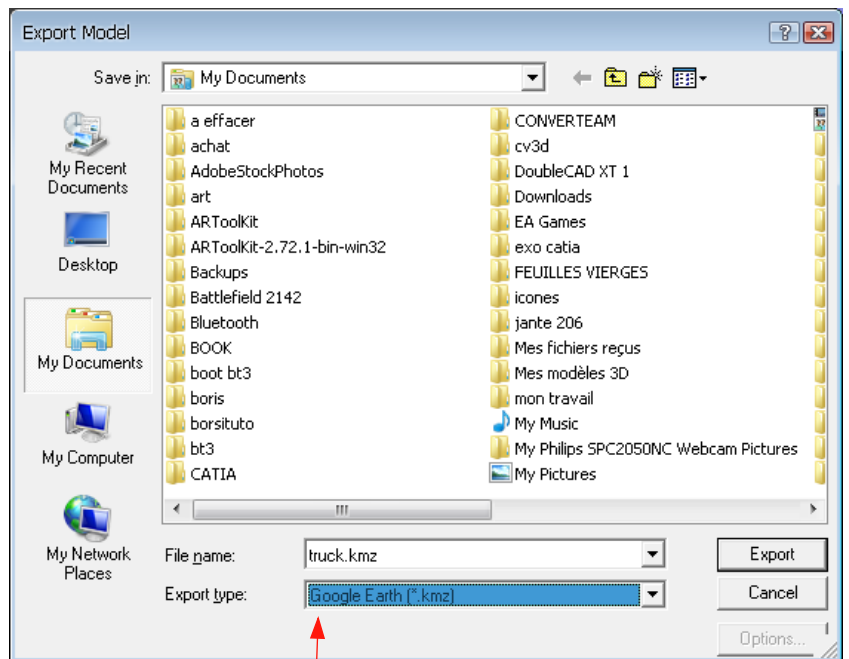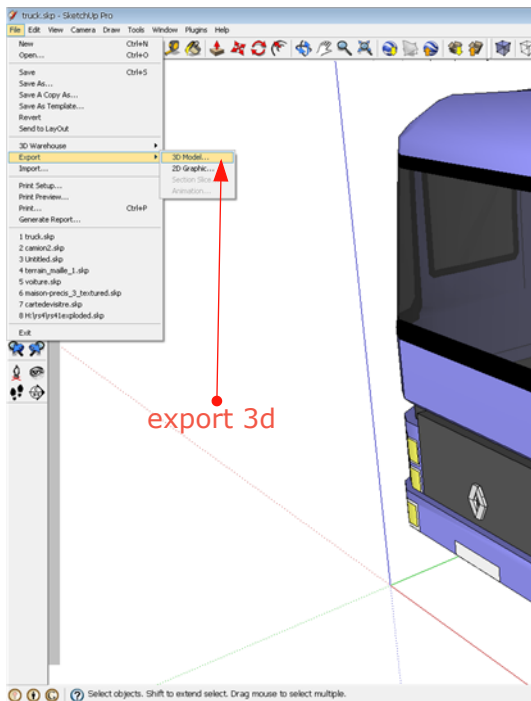
5- Windows browser :

- go to your file browser in the folder you should have created :
"C:\Documents and Settings\Administrator\My Documents\augmented reality" for example
 you should see the two files you just created : "truck.skp" and "truck.kmz"
- enabled file extension :

- go to "tool => folder option"
- uncheck "hide extensions for knows file types
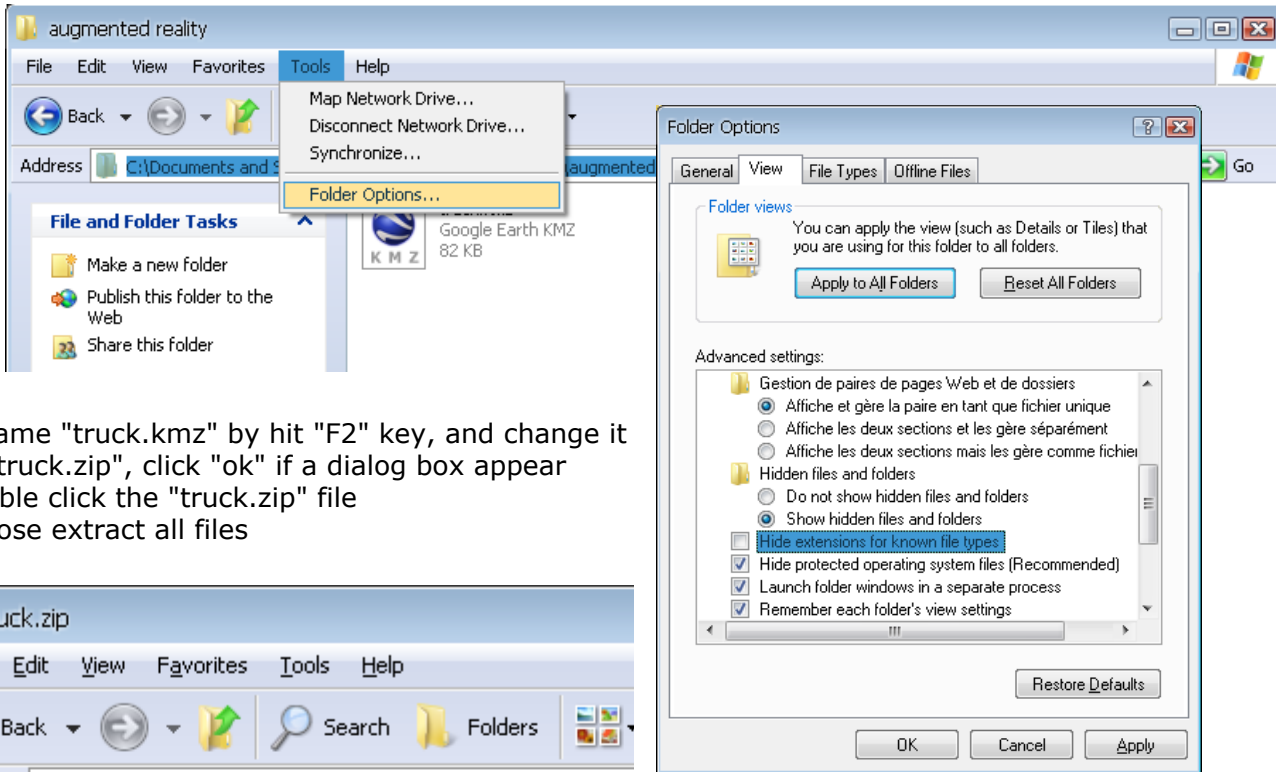
- rename "truck.kmz" by hit "F2" key, and change it
 for "truck.zip", click "ok" if a dialog box appear
- double click the "truck.zip" file
- choose extract all files

extract all files
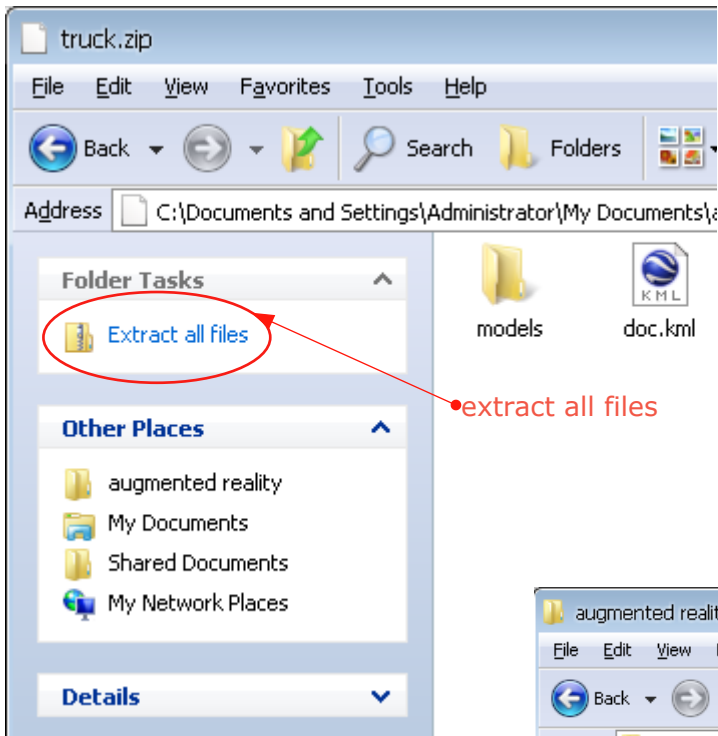
- click next, next, finish
- a new window should open whit your extracted files
 the parent folder named "truck" have been created in
"C:\Documents and Settings\Administrator
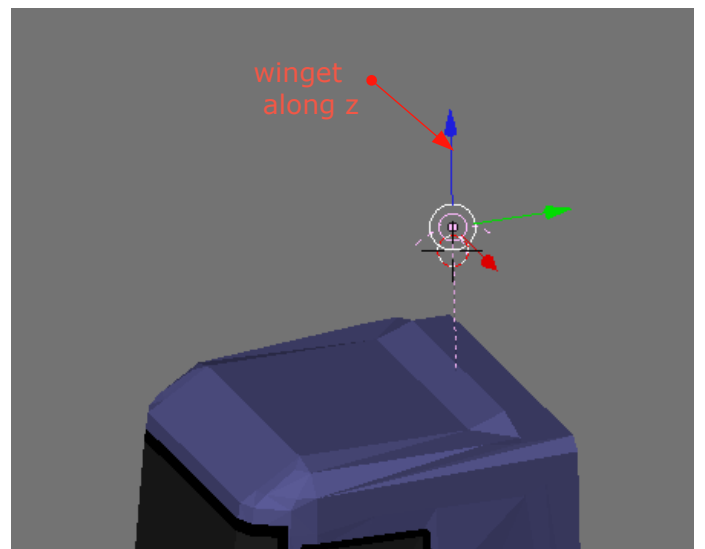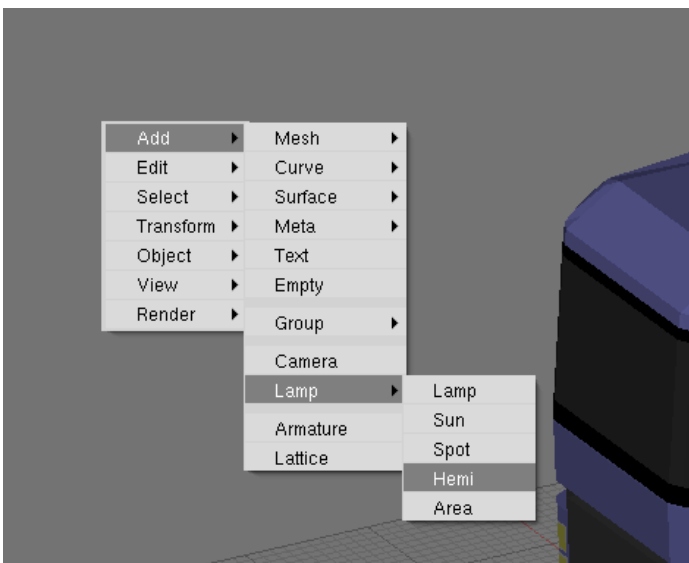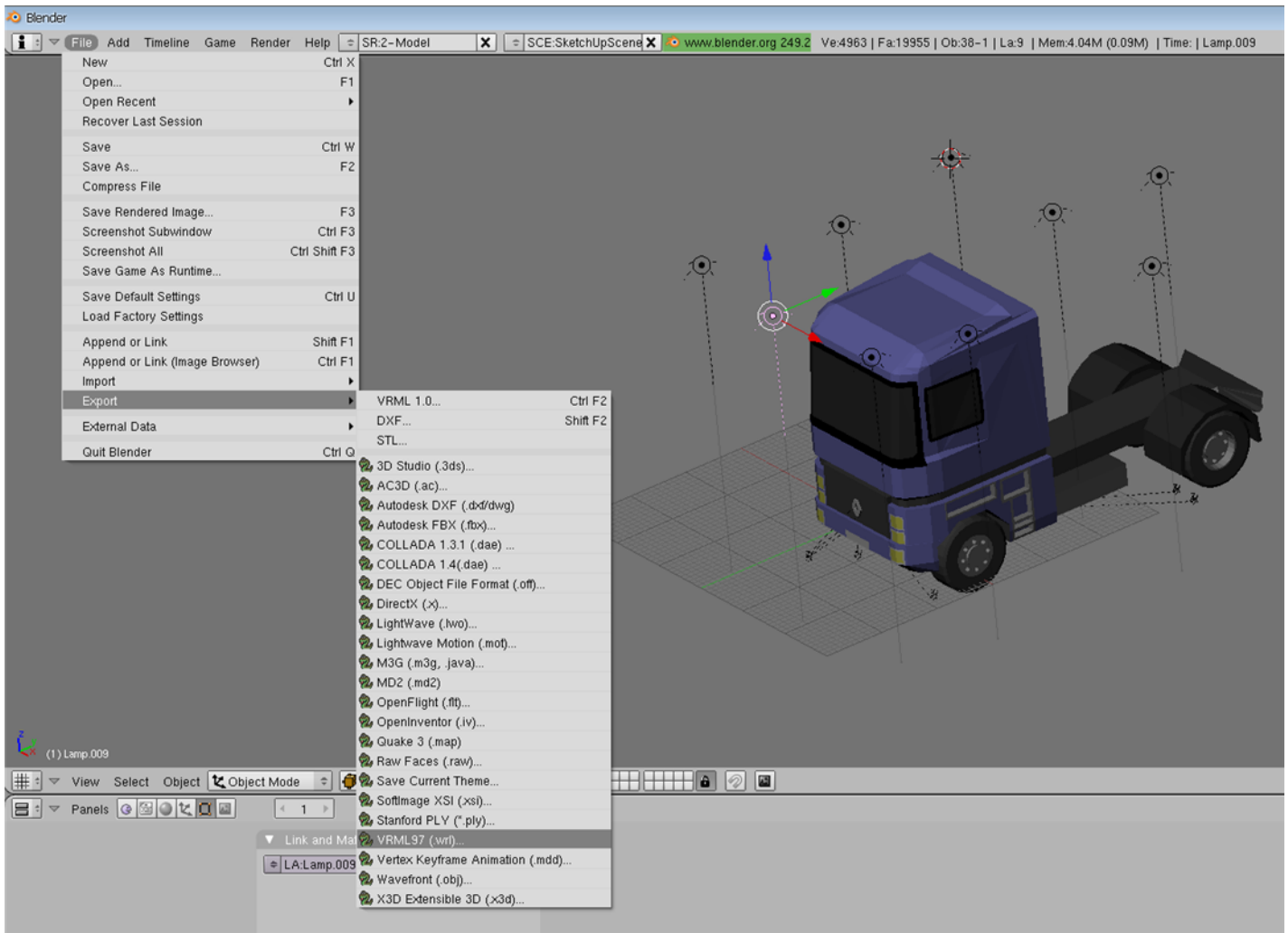\My Documents\augmented reality"
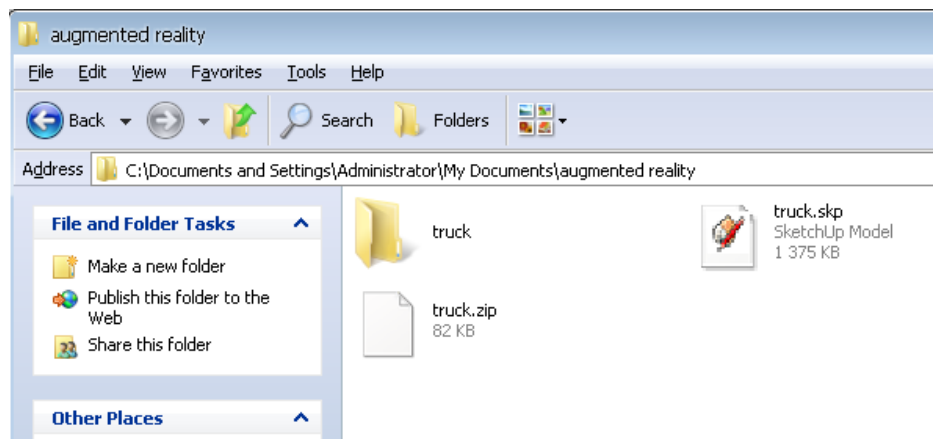
6- Blender :

- launch Blender
- hit delete and accept to delete the small cube in the center
 of the scene
- go to "file => import => COOLADA 1.4 (DAE)"
- hit "..." in the dialog box to start the brownser
- another window appear,
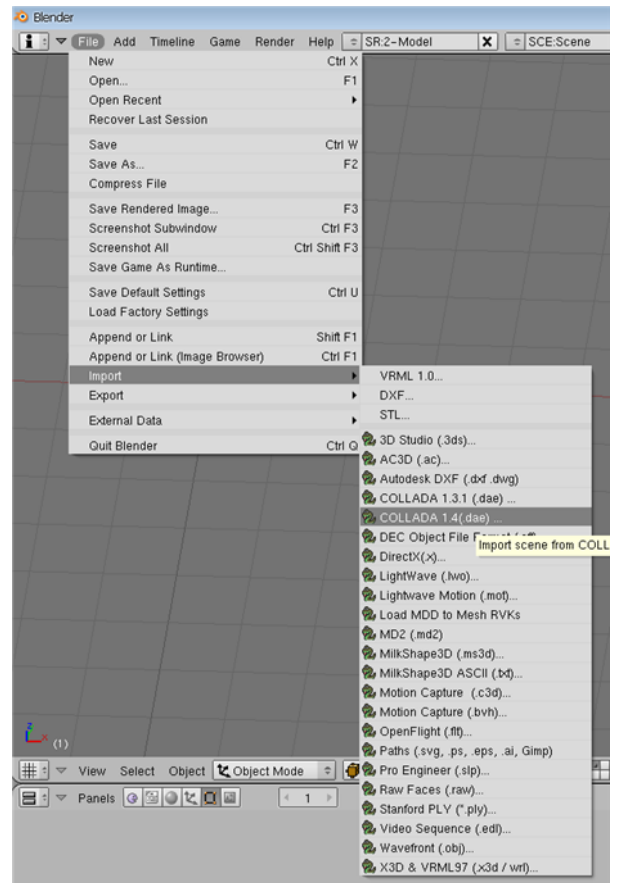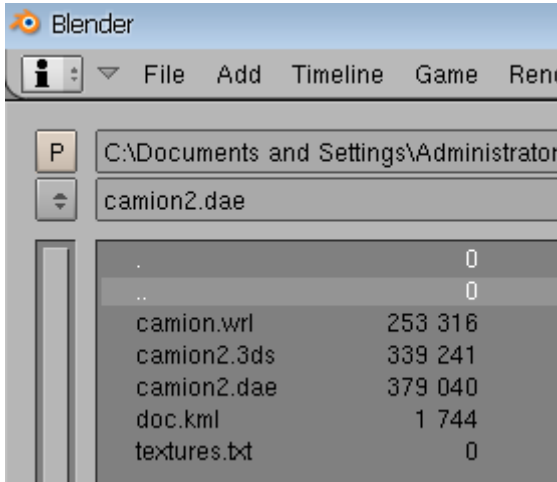
- hit ".." to go to the parent folder, and double click to open a folder
- go to "model" folder into the file you just extract : "C:\Documents and Settings\Administrator
 \My Documents\augmented reality\truck\model"
- and select "truck.dae"
- hit "import dae"
- hit "import and close"
- the model should appear in the 3d window of blender (sometimes the model is not visible
 depend of the size tips : hit "A" to selet all, then hit "S" to scale all your objets, move to
 resize it as needed, hit "enter" to validate
- tips : in blender, orbit = mouse3, pan shift+mouse3, zoom = mouse wheel ;)
- tips : to select an object right click on it, to move select it left click on the winget hold and drag
- hit space then "add => lamp => hemi" or lamp
- tip : copy and paste type "shift+d"

- add many lamps all around the model, and inside if needed, it important !
- export your model in wrml 97 format, go to "file => export => wrml 97"

- hit "ok " in the new dialog box
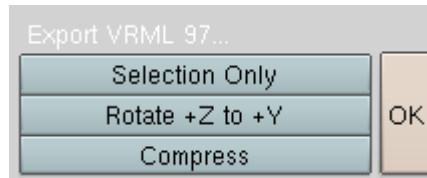
- save "truck.wrl" into "C:\Documents and Settings\Administrator\My Documents\augmented reality"
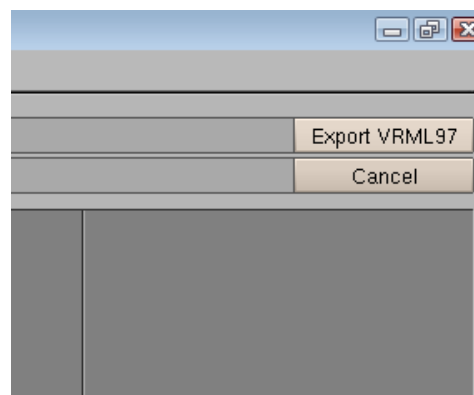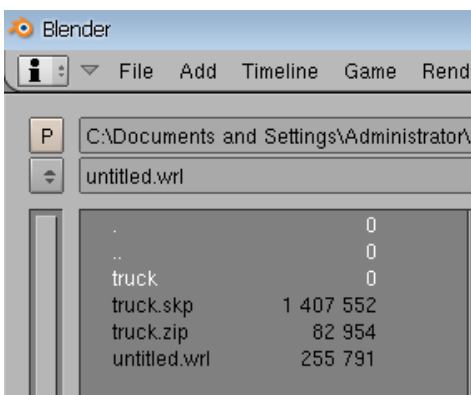
7- ATOMIC

- open the Atomic's directory "C:\ATOMIC07"
- go to "marcadores" sub folder and printthe file named : "pattHiro.pdf"
- go back to Atomic directory
- and launch Atomic by double clicking the file named : "ATOMICbeta07i.exe"
- you should the following window appear :
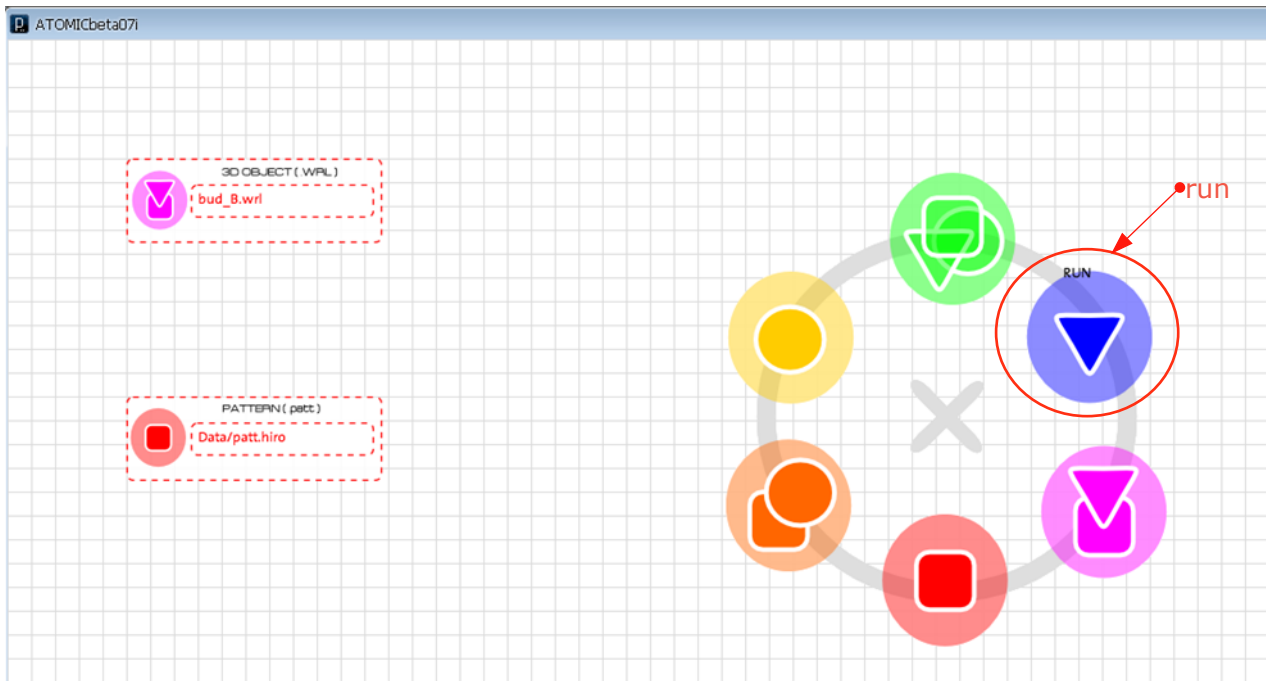
- hit "run"
- make sure you web cam is connected and hold the printed sheet "pattHiro.pdf"
- a dialog box appear, click "ok"
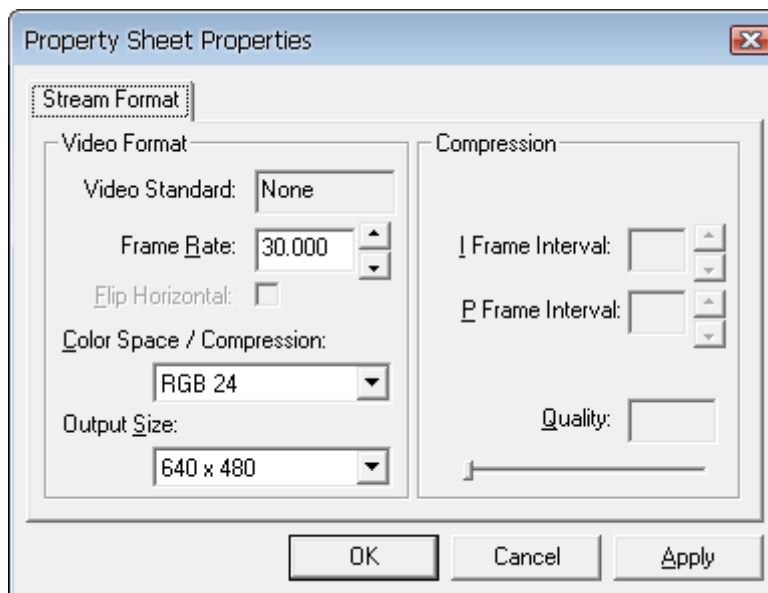
- show the black square printed on "pattHiro" to the webcam
- a bee and a flower should appear, when you move (smoothly) the sheet, the model follow it !

- close the webcam window and go back to the Atomic directory
- open the sub folder named : "wrl"
- copy "truck.wrl" model in "wrl" directory
- copy the file named "bud_B.dat" and rename it to "truck.dat"
- "open" or "open whit" (in right click context menu) it whit notepad

Open With

Choose the program you want to use to open this file:

File: truck.dat

Programs

Recommended Programs:
- Notepad

Other Programs:
- µTorrent
- 3D Toolkit
- Adobe Acrobat 8.1
- Adobe Photoshop CS2
- Adobe Reader 8.1
- arplayer_app
- AutoCAD Application
- CATIA

☐ Always use the selected program to open this kind of file

Browse...

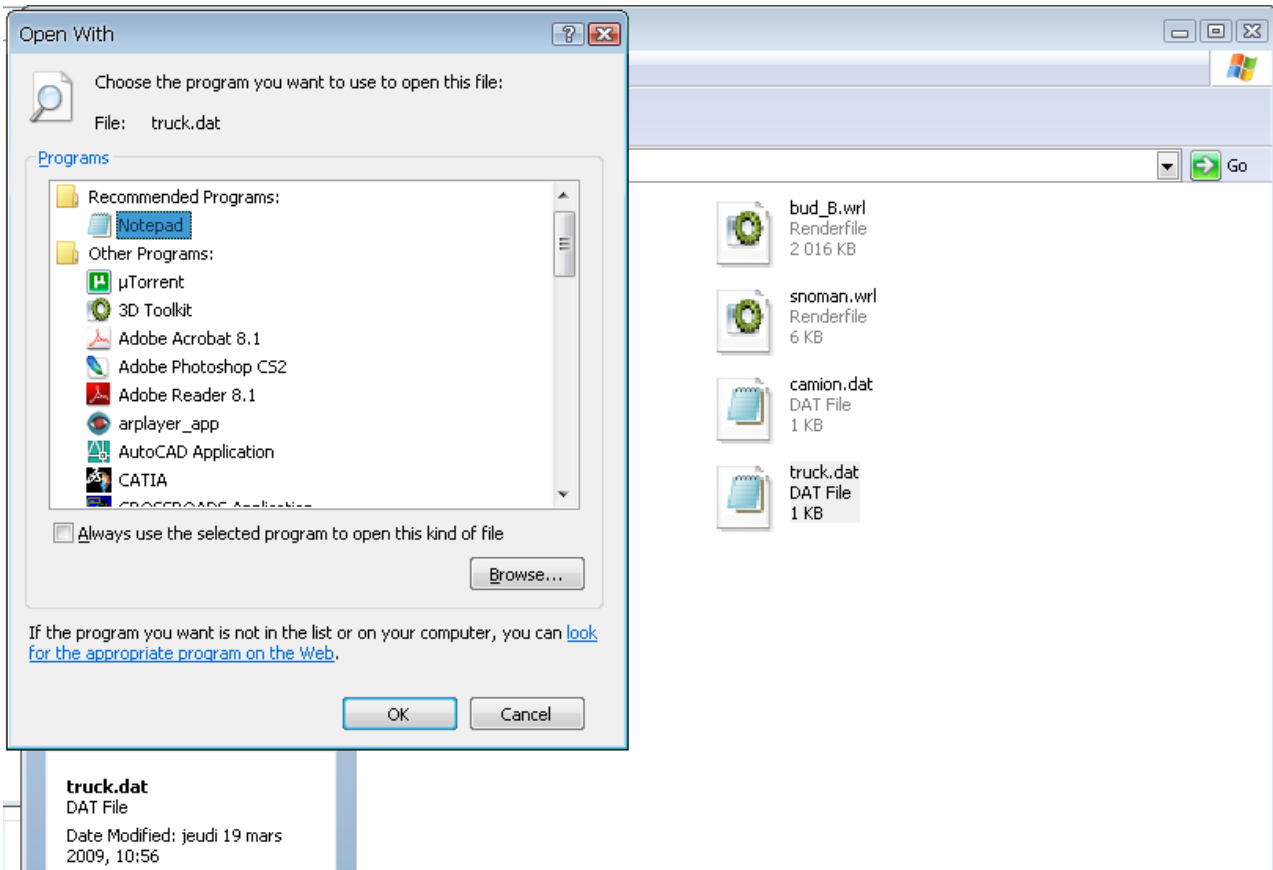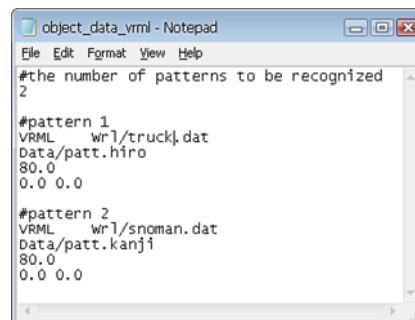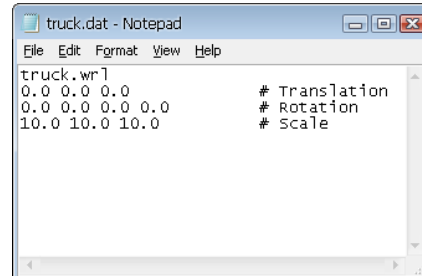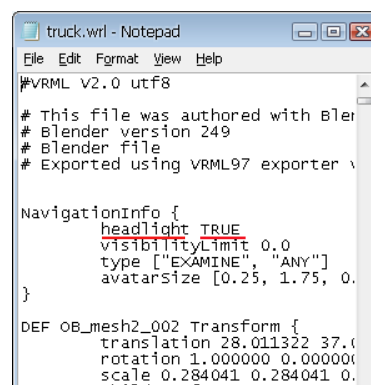If the program you want is not in the list or on your computer, you can look for the appropriate program on the Web.

OK   Cancel

bud_B.wrl
Renderfile
2 016 KB

snoman.wrl
Renderfile
6 KB

camion.dat
DAT File
1 KB

truck.dat
DAT File
1 KB

truck.dat
DAT File

Date Modified: jeudi 19 mars 2009, 10:56

- on the line of the text, change "bud_B.wrl" to "truck.wrl
- tip : you can change position, or rotation or scale of your model under
- close the notepad and accept to save it

- now go back to Atomic folder and go to sub folder named : "data"
- open "object_data_vrml" whit a notepad
- under the text "#pattern 1" change
 the text "WRML   Wrl/xxxx.dat"
 for "WML   Wl/truck.dat"
- close the notepad and accept to save it

truck.dat - Notepad
File Edit Format View Help
```
truck.wrl
0.0 0.0 0.0           # Translation
0.0 0.0 0.0 0.0       # Rotation
10.0 10.0 10.0        # Scale
```

object_data_vrml - Notepad
File Edit Format View Help
```
#the number of patterns to be recognized
2

#pattern 1
VRML     wrl/truck.dat
Data/patt.hiro
80.0
0.0 0.0

#pattern 2
VRML     wrl/snoman.dat
Data/patt.kanji
80.0
0.0 0.0
```

- "open" or "open whit" (in left click context menu)
  "truck.wrl" whit notepad
- search (hit "F3") for the word "headlight"
- be sure the following word is "TRUE" if not ("FALSE"), replace by "TRUE"
- close and save

truck.wrl - Notepad
File Edit Format View Help
```
#VRML V2.0 utf8

# This file was authored with Blen
# Blender version 249
# Blender file
# Exported using VRML97 exporter v

NavigationInfo {
        headlight TRUE
        visibilityLimit 0.0
        type ["EXAMINE", "ANY"]
        avatarSize [0.25, 1.75, 0.
}

DEF OB_mesh2_002 Transform {
        translation 28.011322 37.0
        rotation 1.000000 0.00000
        scale 0.284041 0.284041 0.
        children [
```

- go back or launch to the Atomic program and click "run"
- hold the sheet you printed and show the black square to your webcam
- something like this should appear
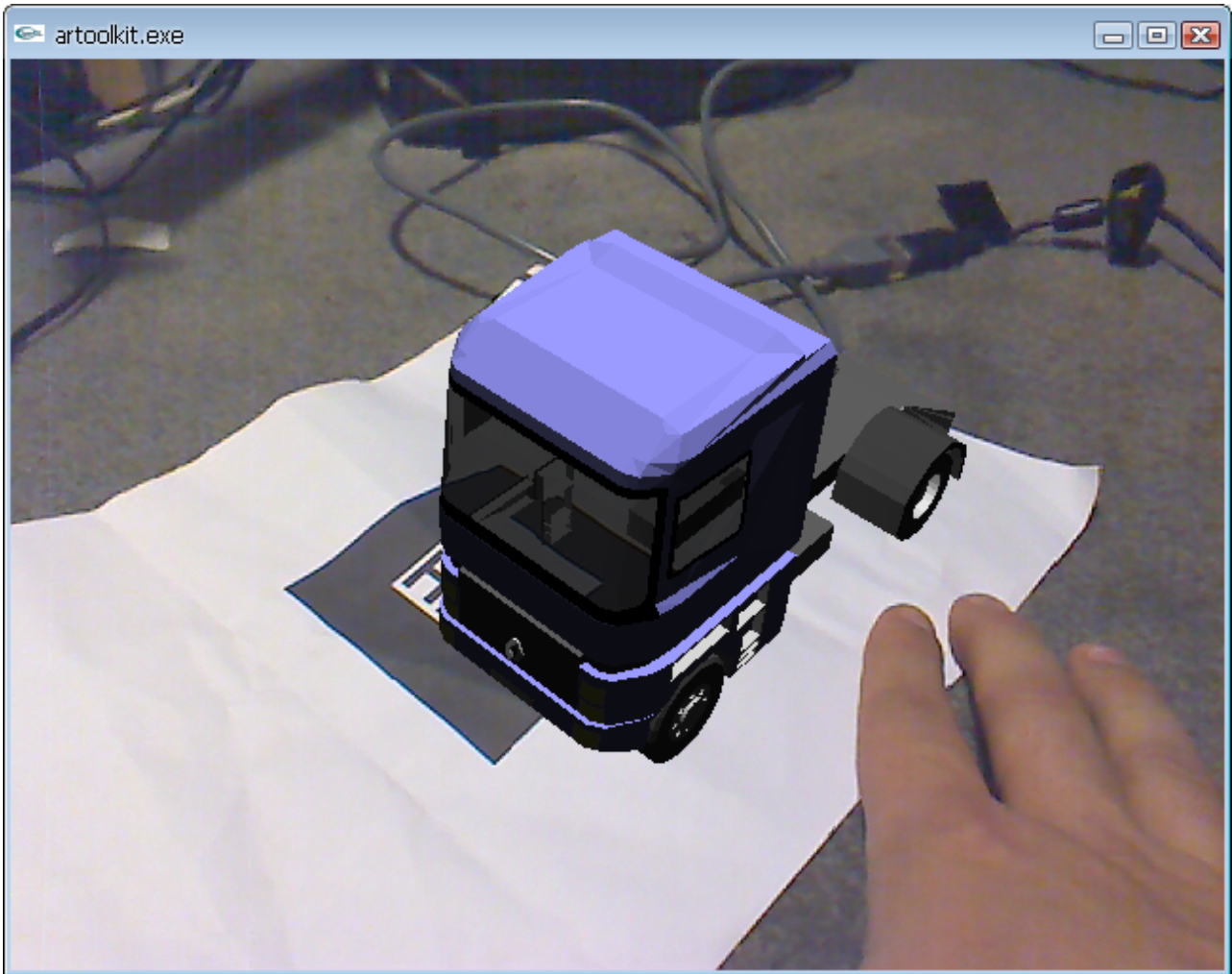
- if you move the sheet, the model follow it !!!

- Remember you are allowed to use all this programs for personal or educational use

NOT FOR COMMERCIAL USE

- for commercial or other uses, buy : ARMEDIA from inglobetechnologie, on

http://www.inglobetechnologies.com/en/products/arplugin_su/info.php

- for more informations or questions : gta974@gmail.com
- if you need the layout file, .doc or .odt to modify something like language, just ask me
- tip if you have a printer : open the "pattHiro.pdf" and aim the webcam to it
- coming soon, how to display more than 1 model (6 maxi)