

# FME et la 3D

Régis LONGCHAMP  
Ingénieur EPFL



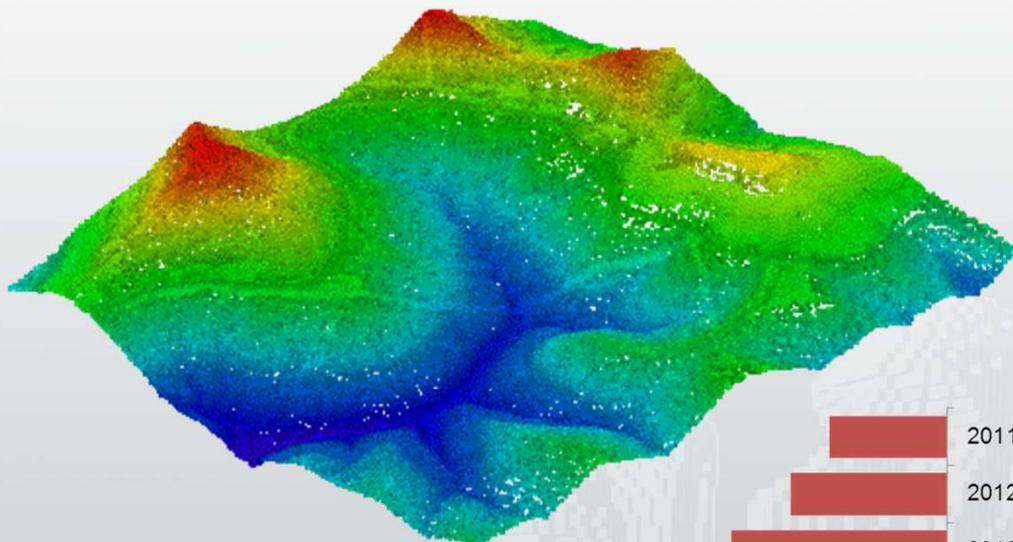
WORLD TOUR  
**2015**



# FME et la 3D



## Nuage de points



LIDAR, levé théodolite  
ou GPS

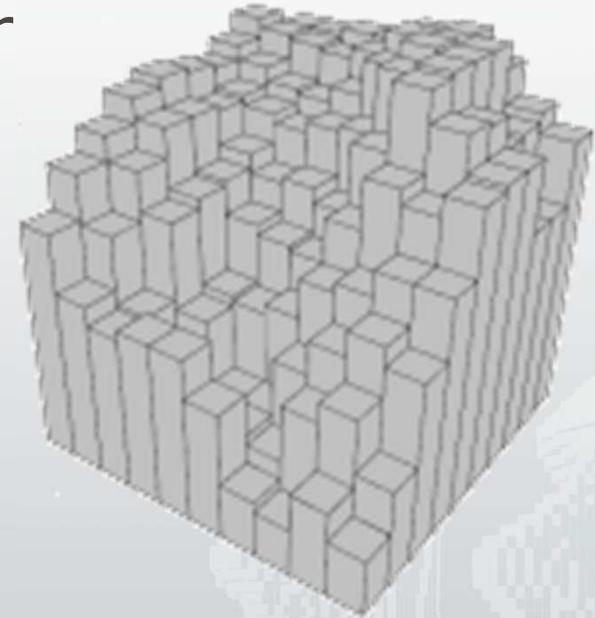
CONNECT. TRANSFORM. AUTOMATE.



# FME et la 3D



## Raster



MNT, MNS, orthophoto

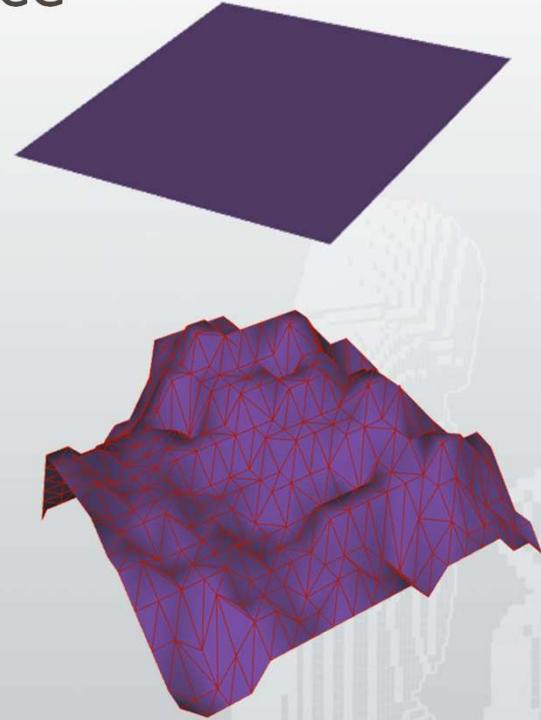
CONNECT. TRANSFORM. AUTOMATE.



# FME et la 3D



## Surface



CONNECT. TRANSFORM. AUTOMATE.



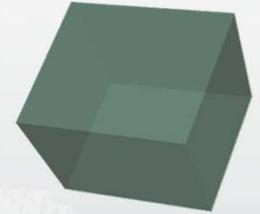
# FME et la 3D



## Solid

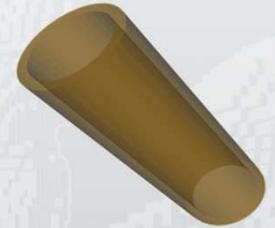
### Box

- 3D solid primitive
- Not really useful



### Extrusion

- Base Face and extrusion direction/distance



### BRepSolid

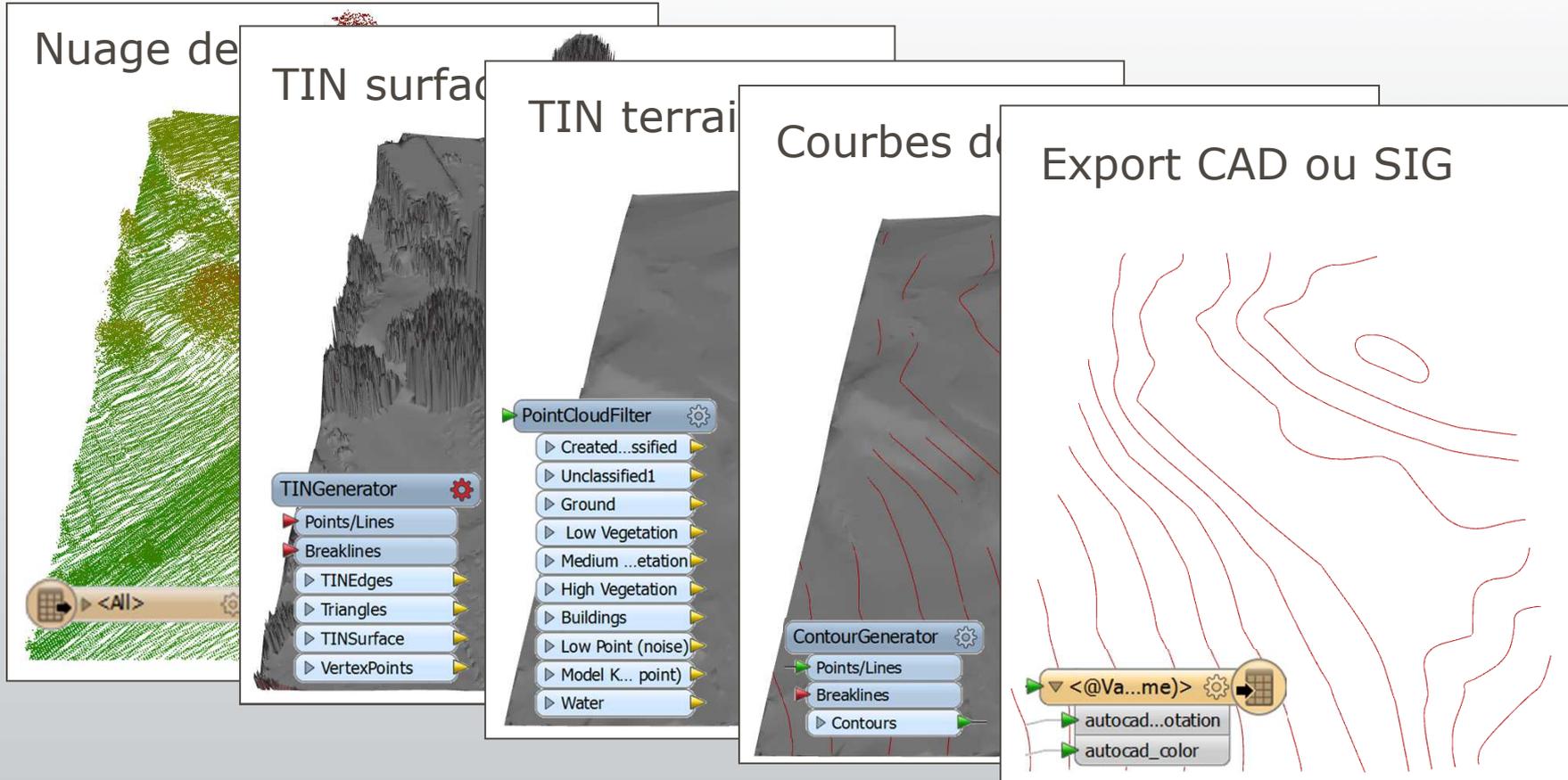
- Solid defined by closed CompositeSurface boundary



CONNECT. TRANSFORM. AUTOMATE.



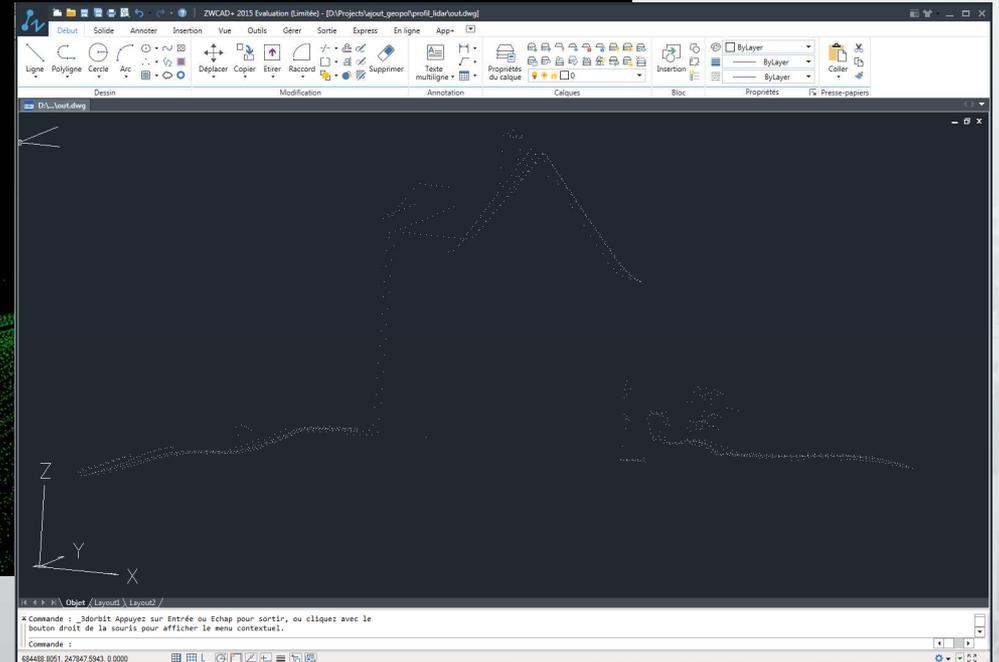
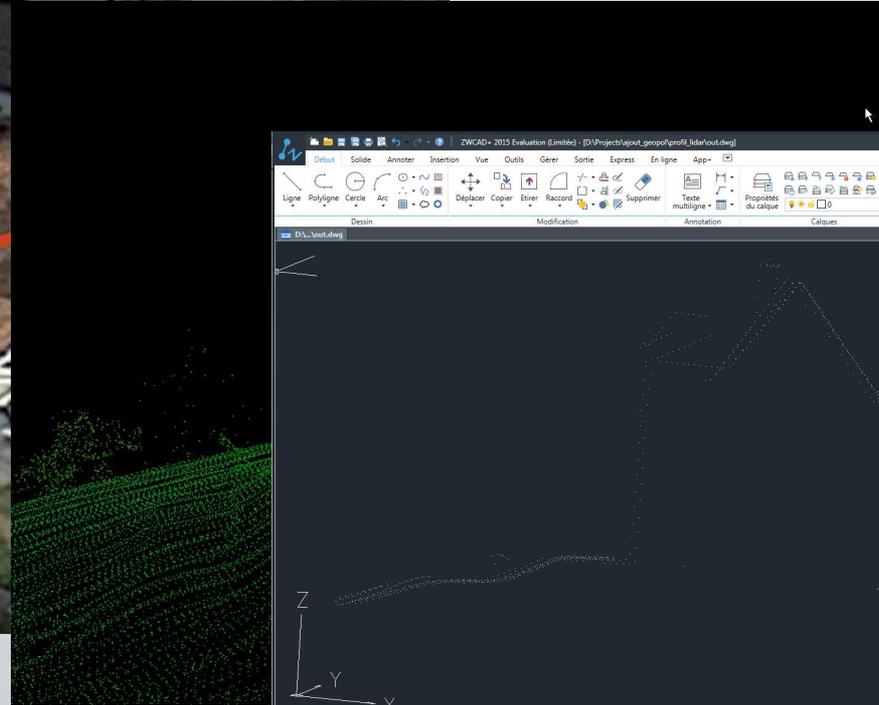
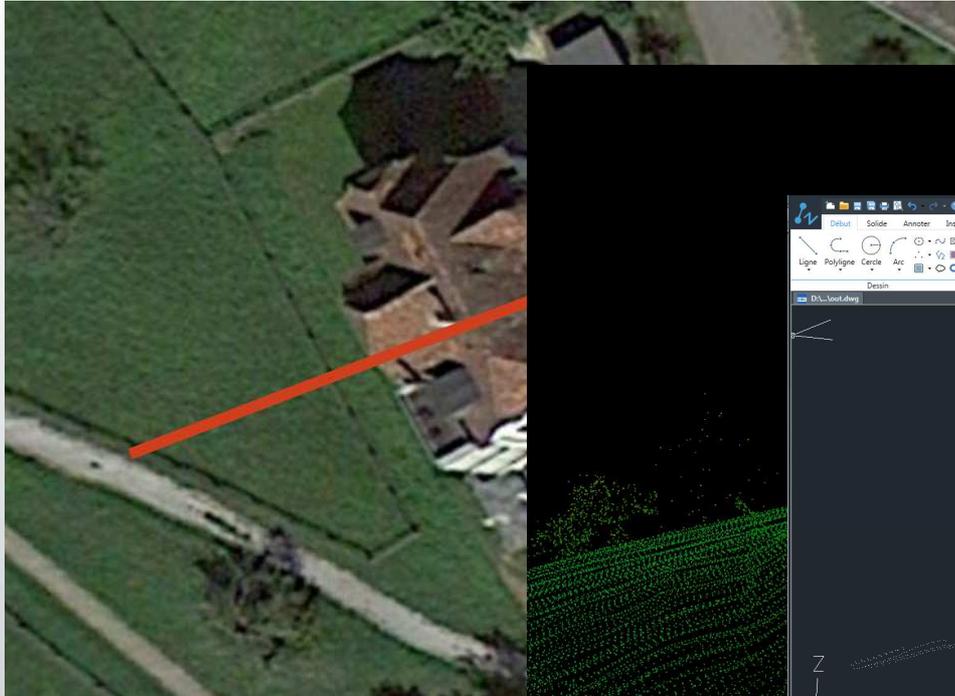
# LIDAR -> courbes de niveau



CONNECT. TRANSFORM. AUTOMATE.



# LIDAR -> profil



CONNECT. TRANSFORM. AUTOMATE.



# Point cloud - transformer

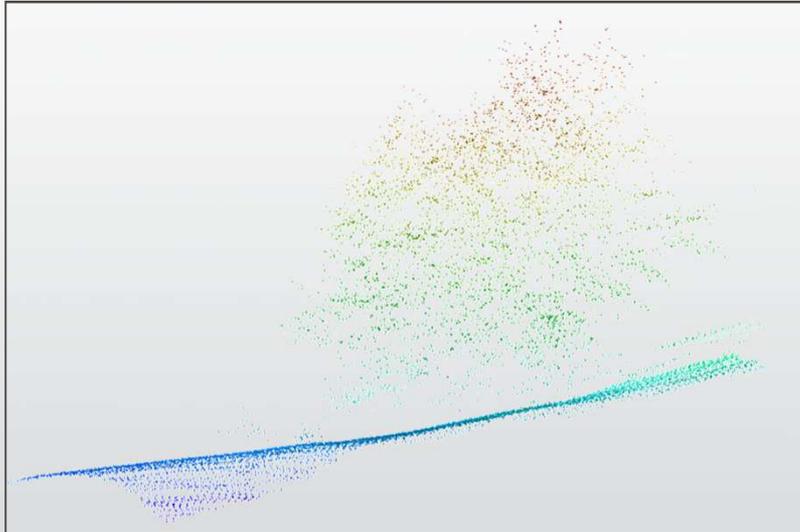


- Assembler
- Alléger, densifier
- Modifier, supprimer, ajouter des composants
- Création
- Transformations spatiales
- Filtrer, découper, tuiler
- Opérations statistiques
- Transformer vers d'autres formats

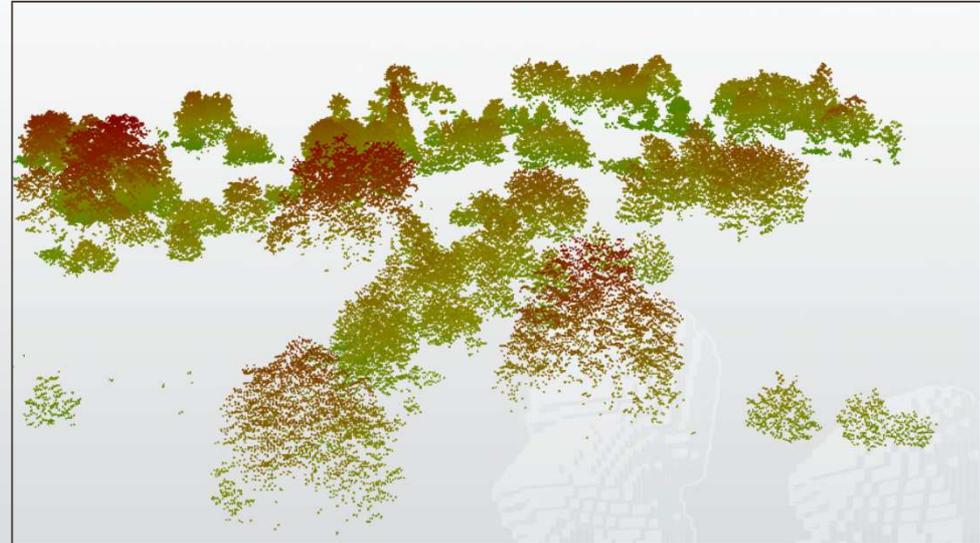
CONNECT. TRANSFORM. AUTOMATE.



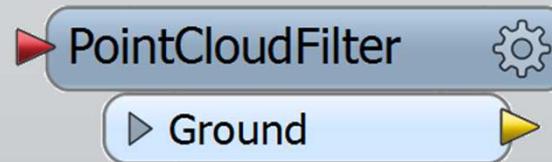
# Analyse données Lidar



Nuage brut



Nuage Filtré



CONNECT. TRANSFORM. AUTOMATE.



# Analyse données Lidar

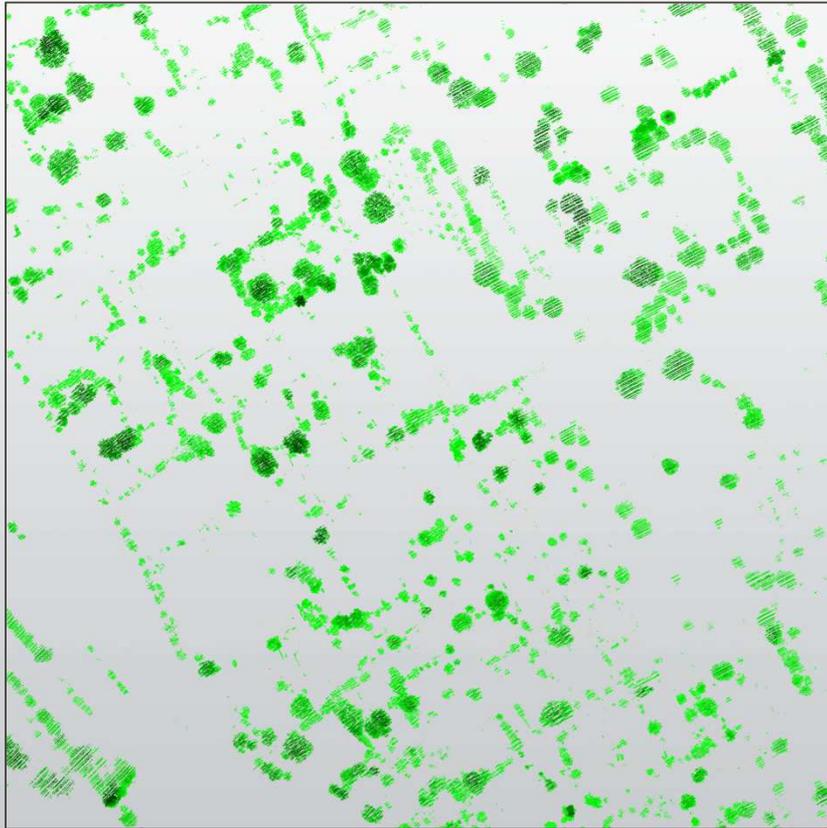
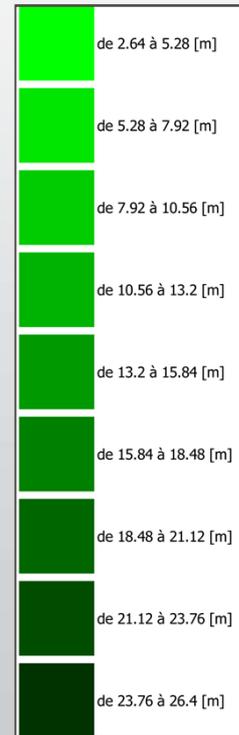


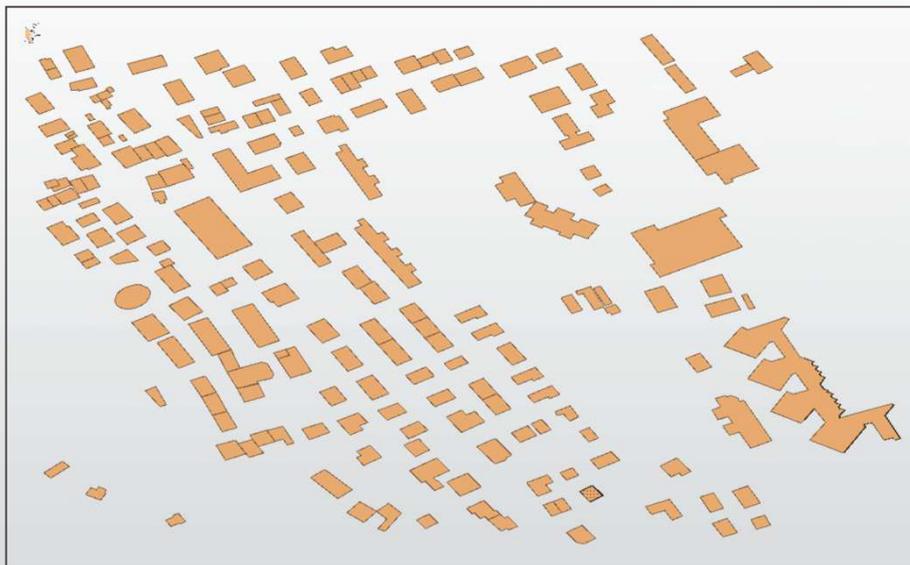
Image raster



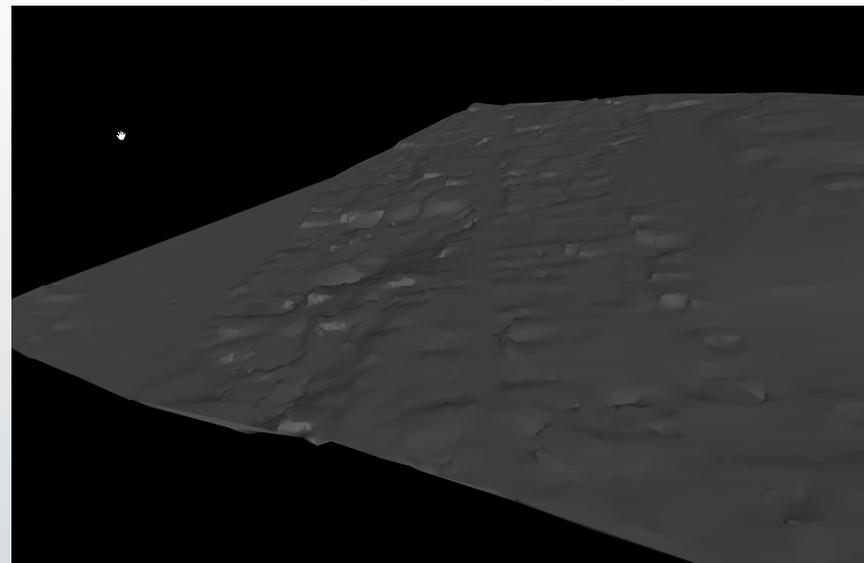
CONNECT. TRANSFORM. AUTOMATE.



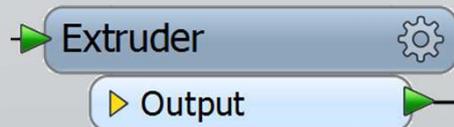
# Point cloud + vecteur



Données vectorielles  
(Bâtiment OSM)

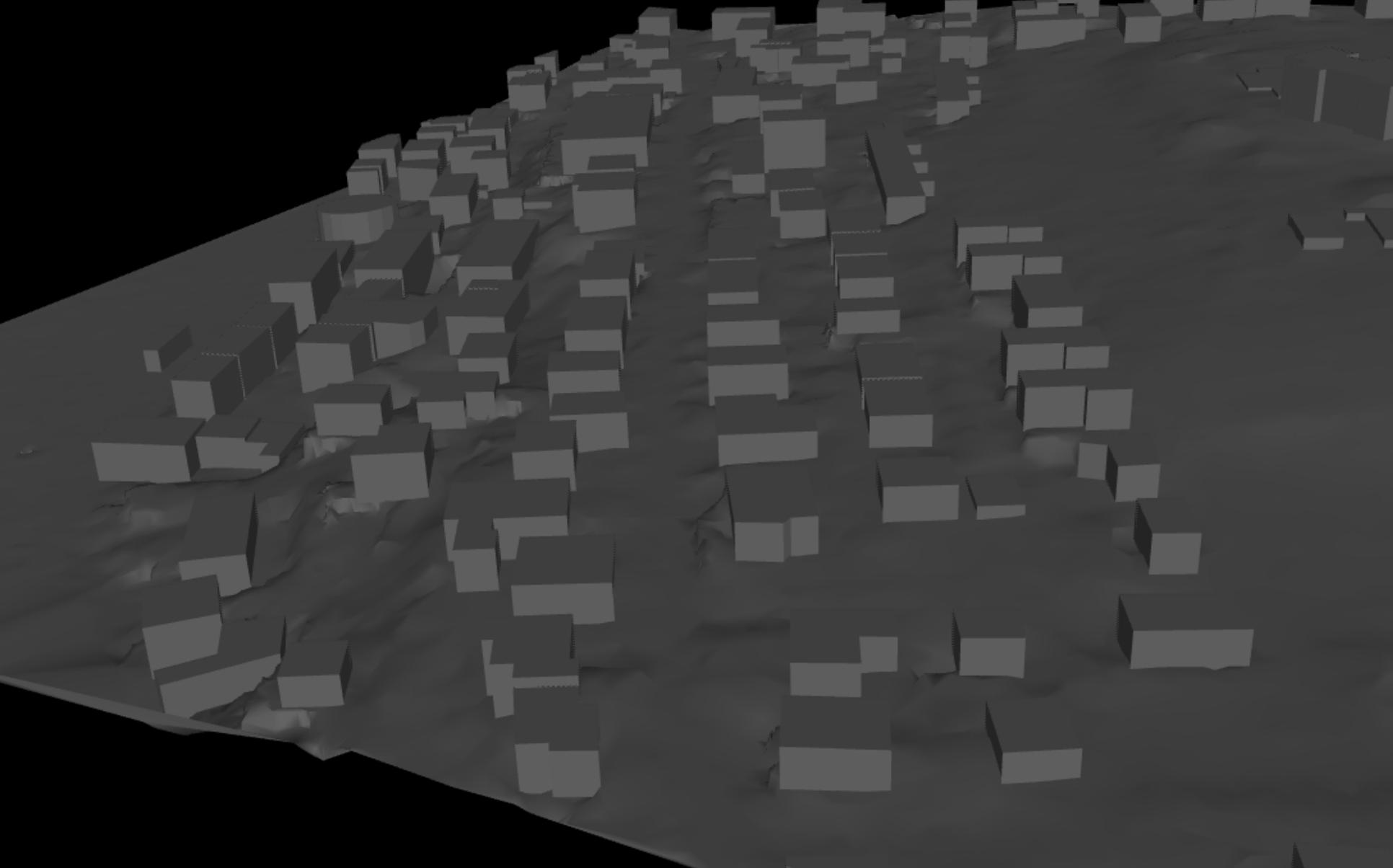


Modèle numérique de terrain



CONNECT. TRANSFORM. AUTOMATE.

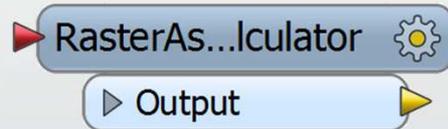




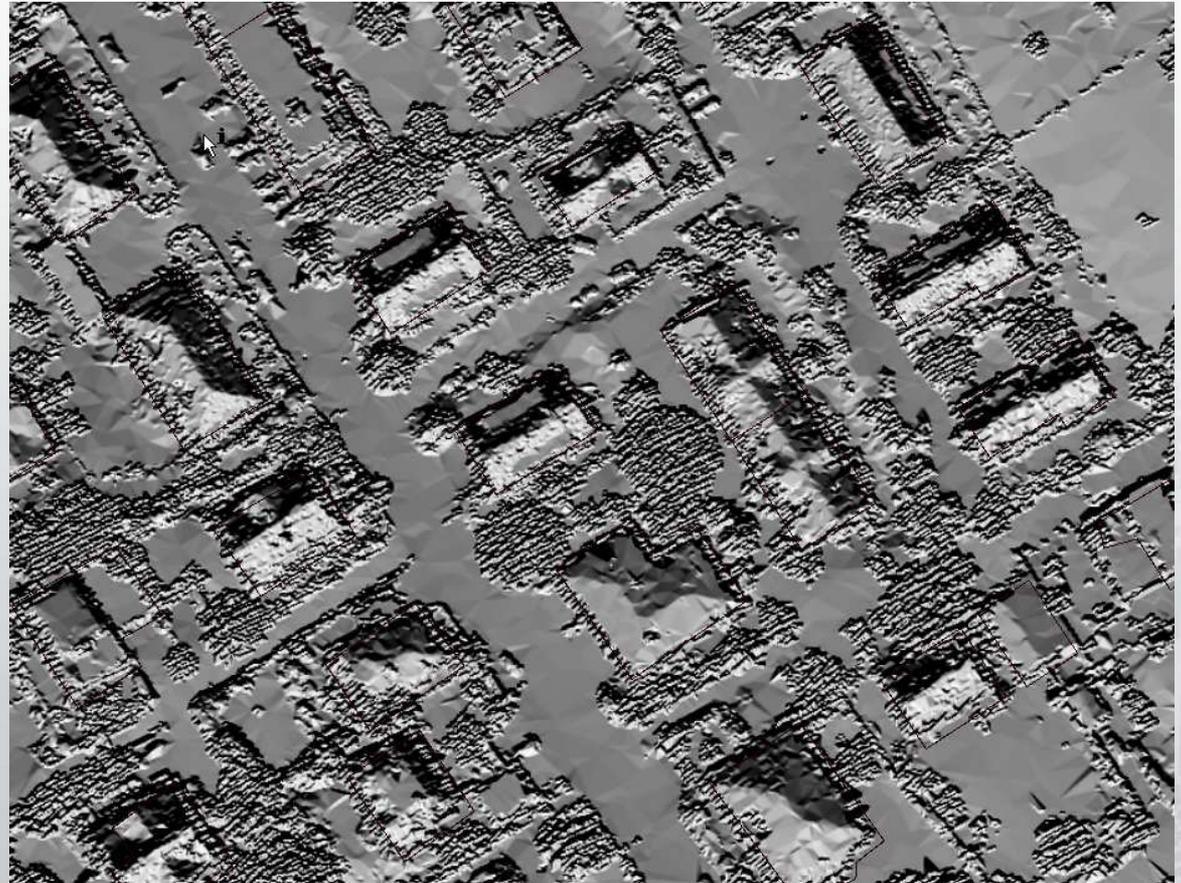
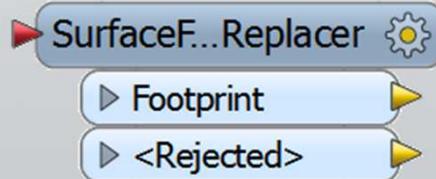
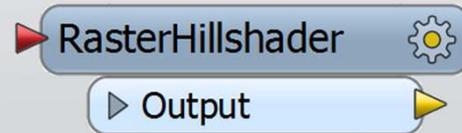
# Analyse données Lidar



Potentiel solaire  
- Orientation des  
pentes de toit

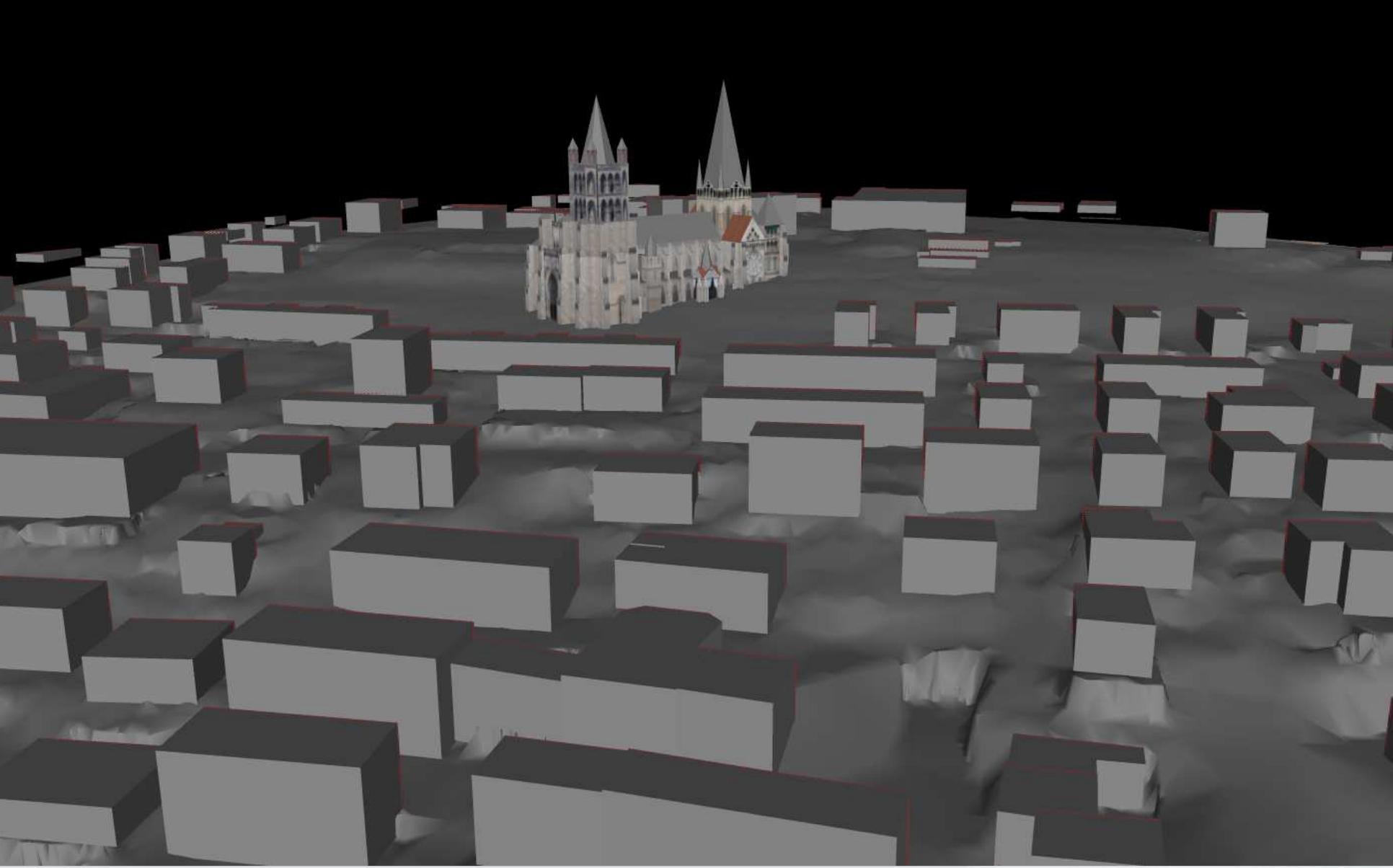


- Ombre



CONNECT. TRANSFORM. AUTOMATE.

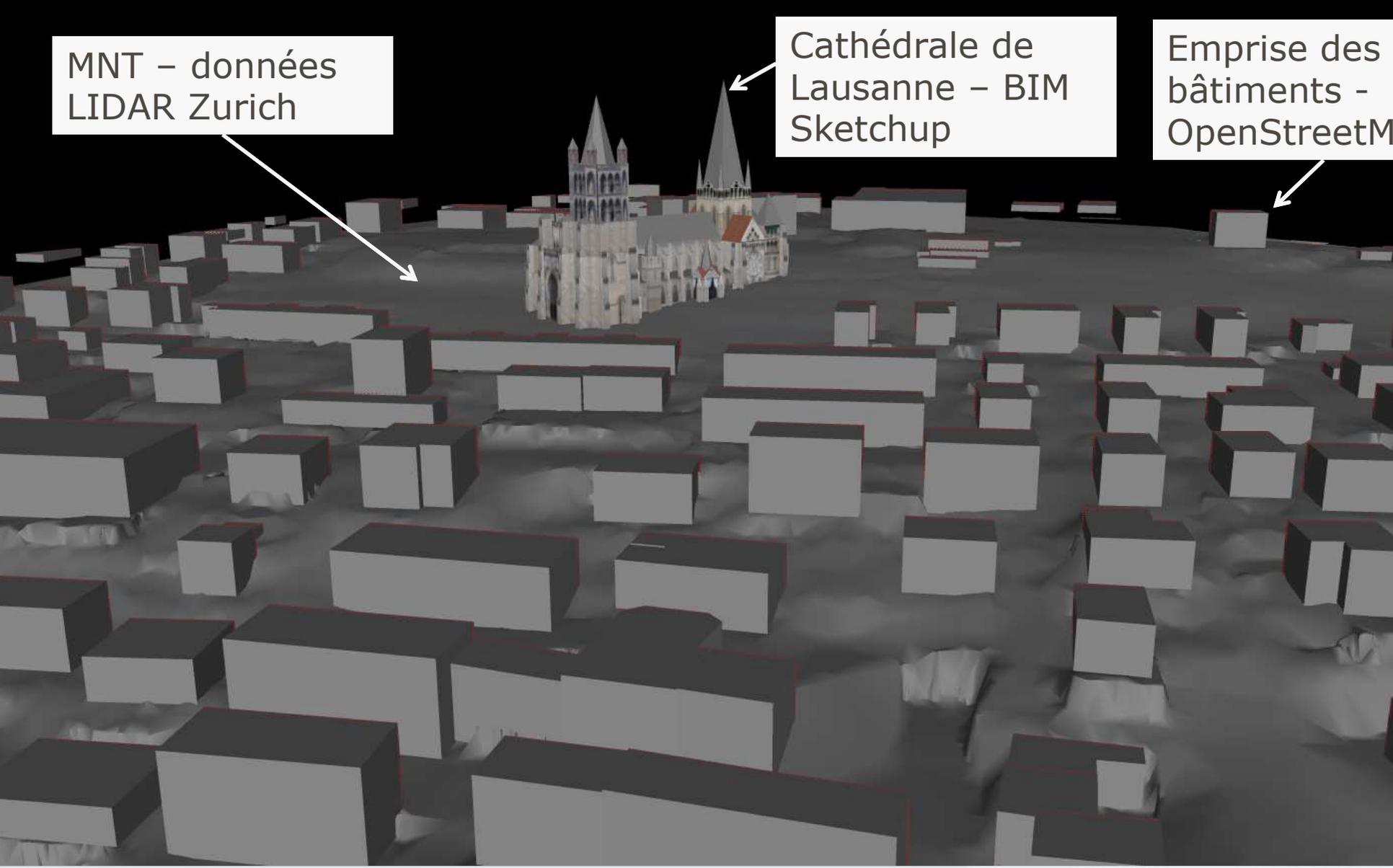




MNT – données  
LIDAR Zurich

Cathédrale de  
Lausanne – BIM  
Sketchup

Emprise des  
bâtiments -  
OpenStreetM



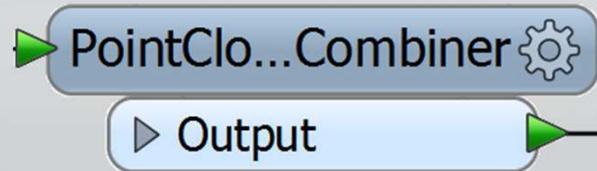
# Model -> point cloud



De la «réalité» (nuage de points) à la modélisation

Mais aussi :

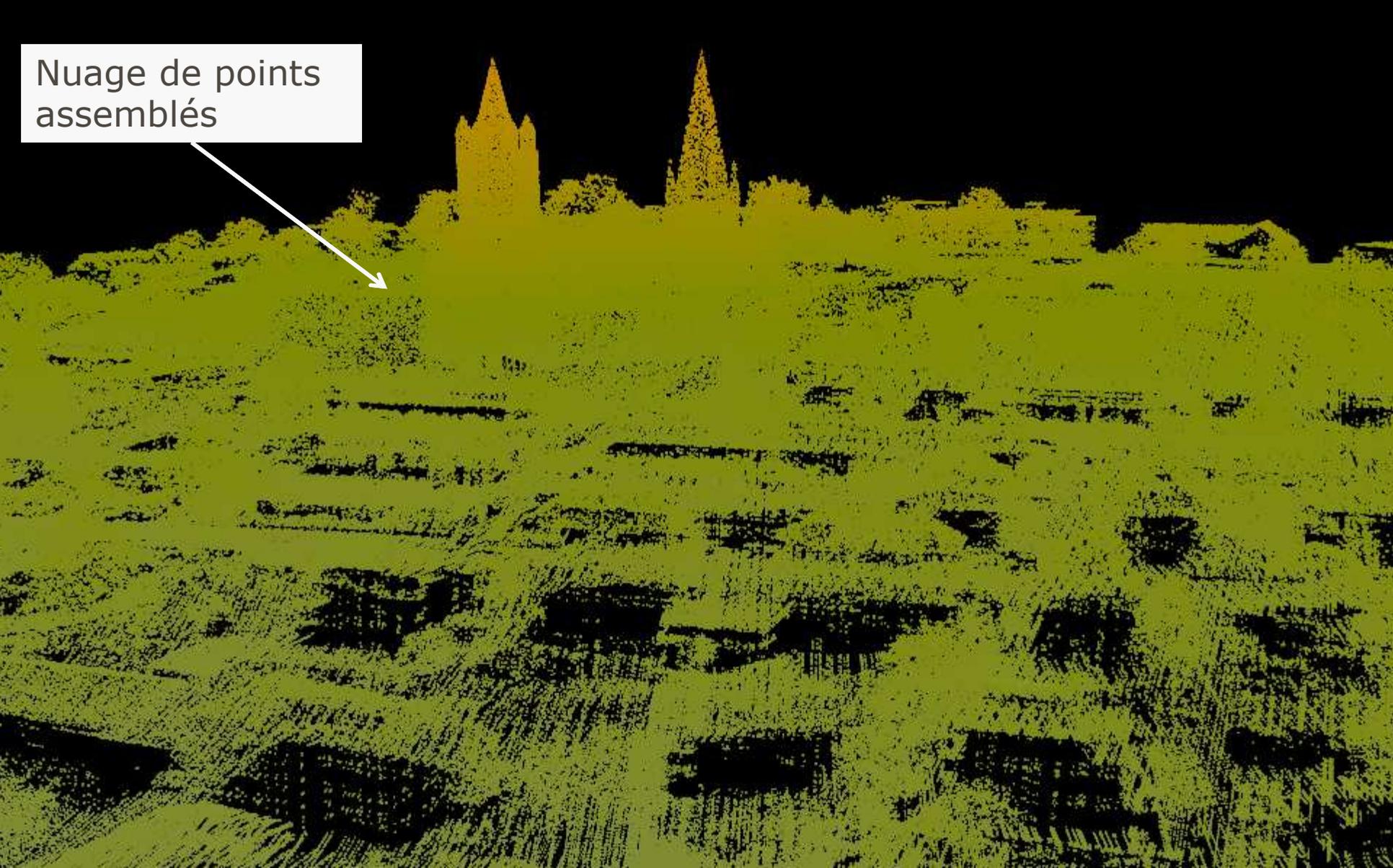
De la modélisation à la «réalité»

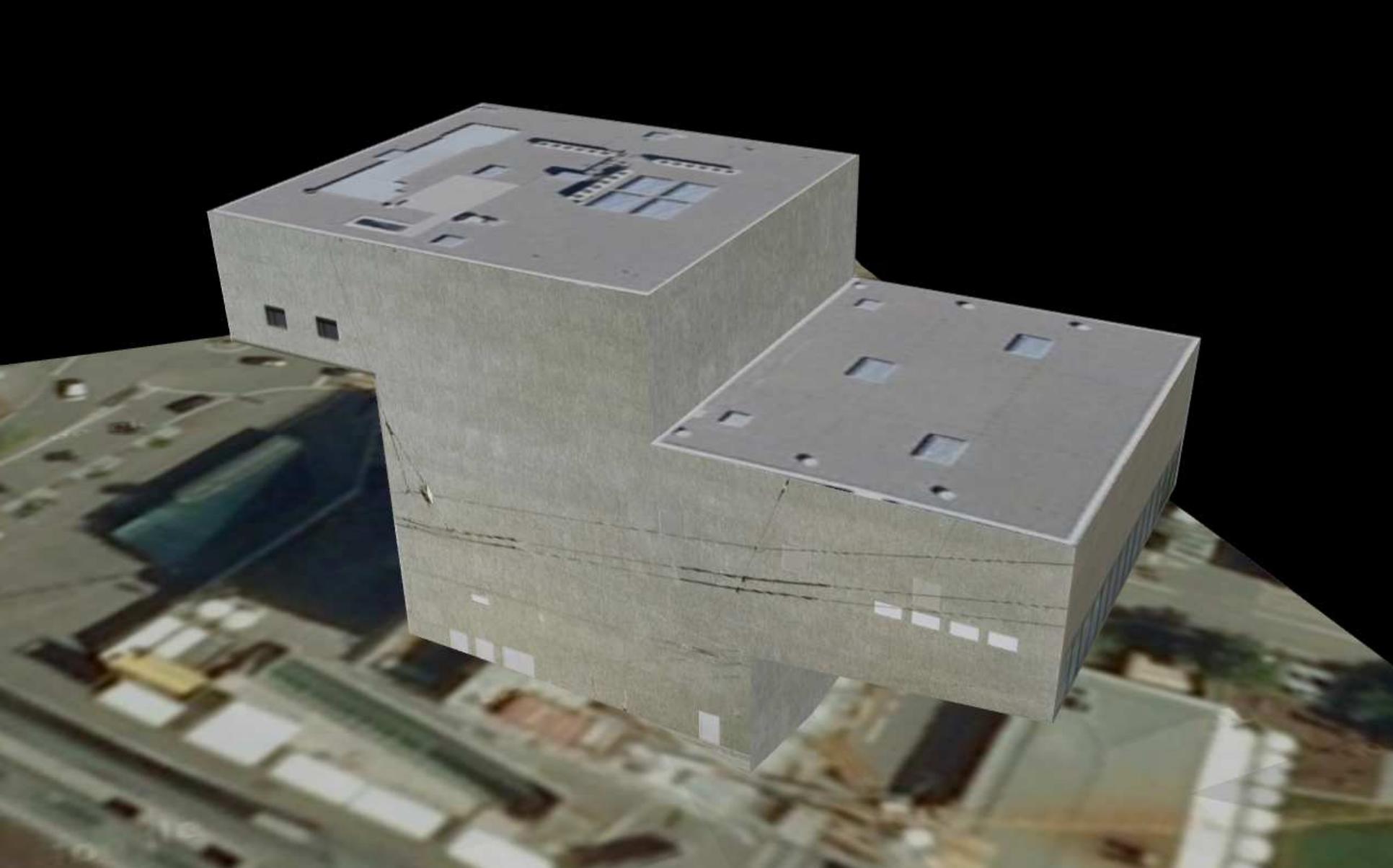


CONNECT. TRANSFORM. AUTOMATE.

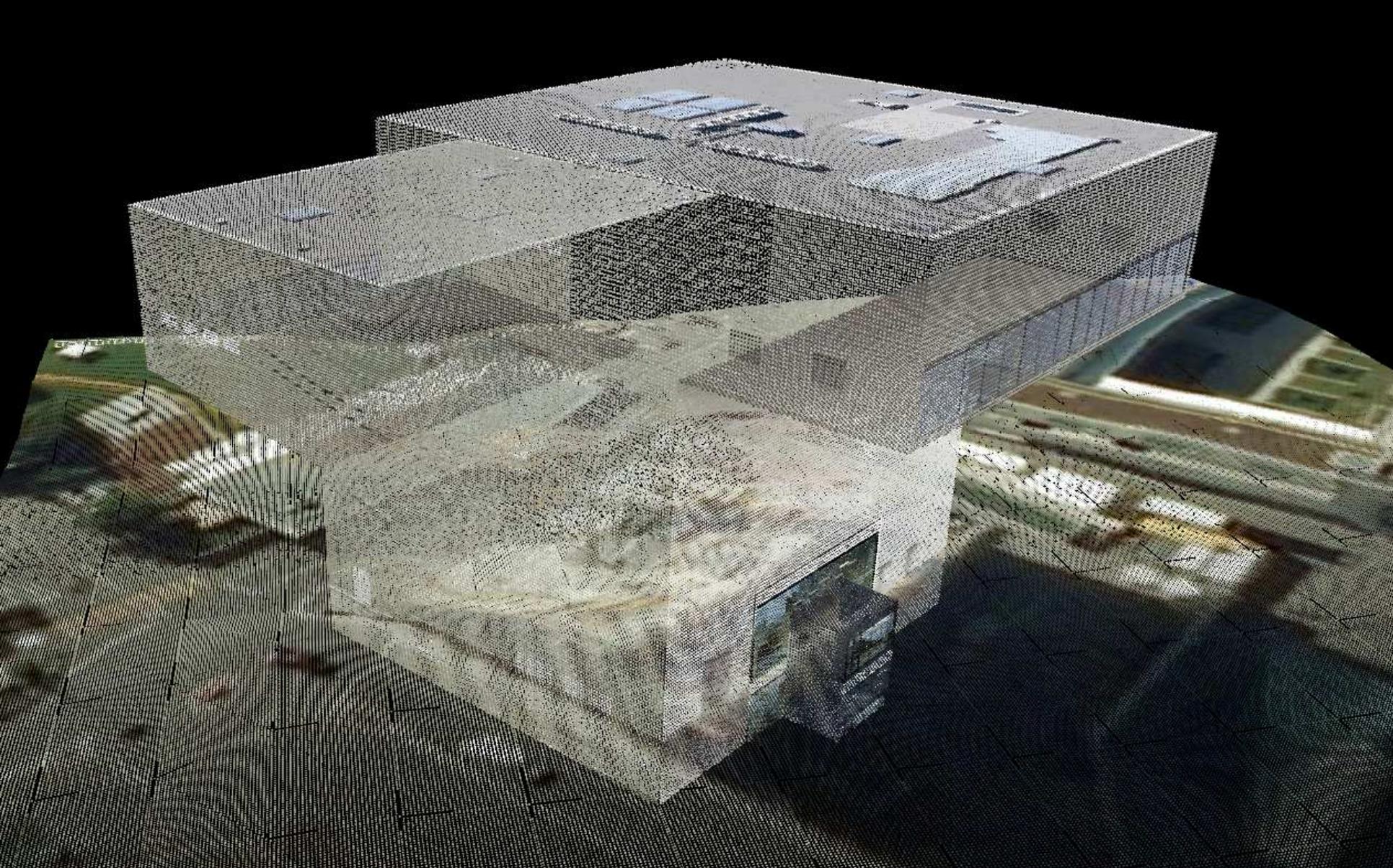


Nuage de points  
assemblés









# BIM



BIM : Building Information Modeling

Modélisation des bâtiments, modèles très complets

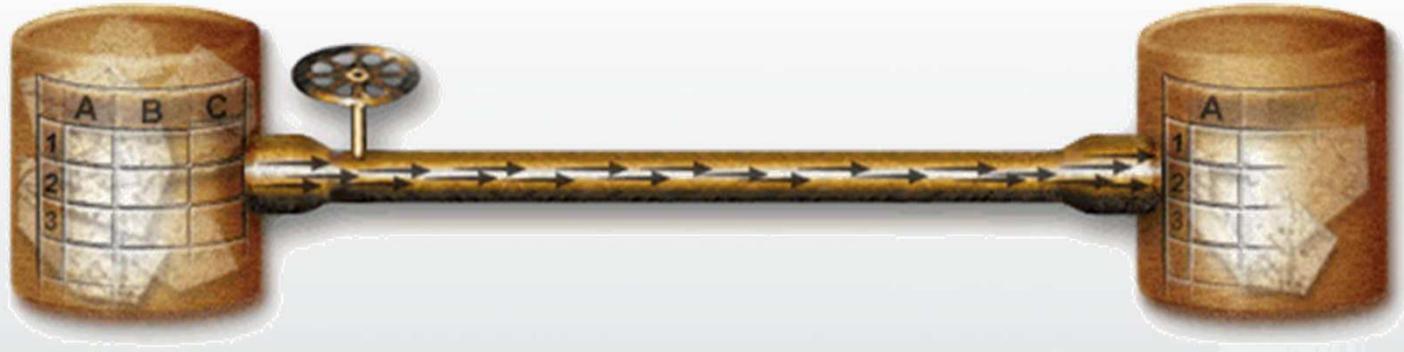
Potentiel :

- Aménagement du territoire, urbanisme
- Maintenance
- Gestion énergétique
- Développement durable
- Sécurité
- Modélisations diverses (historiques, commerciales, etc)

CONNECT. TRANSFORM. AUTOMATE.



# Principaux formats BIM



Adobe 3D pdf

Autodesk (3DS, AutoCAD civil 3D,  
Map 3D etc...)

CityGML

Google sketchUp

Revit

IFC

ArcGIS

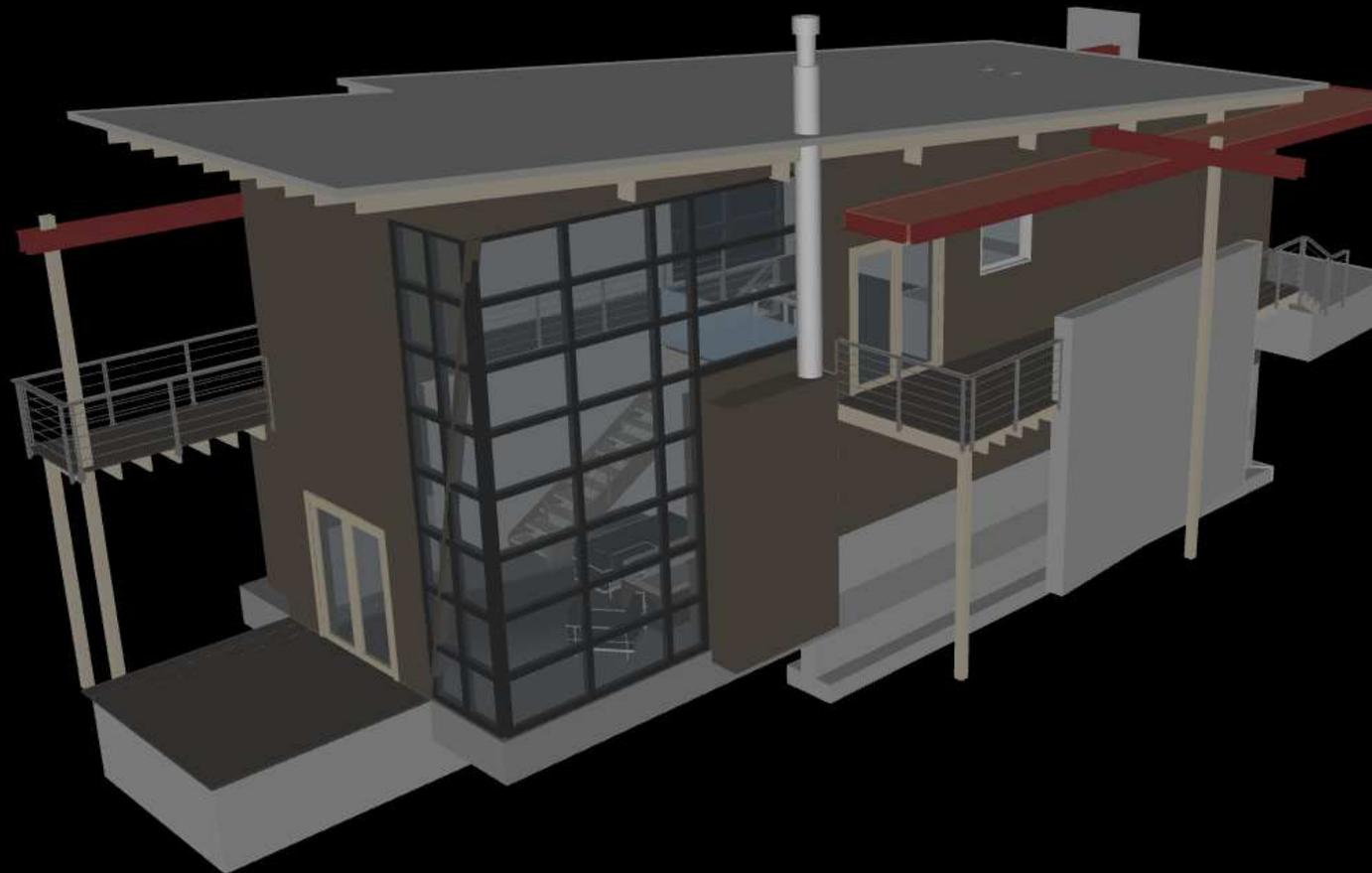
Etc...

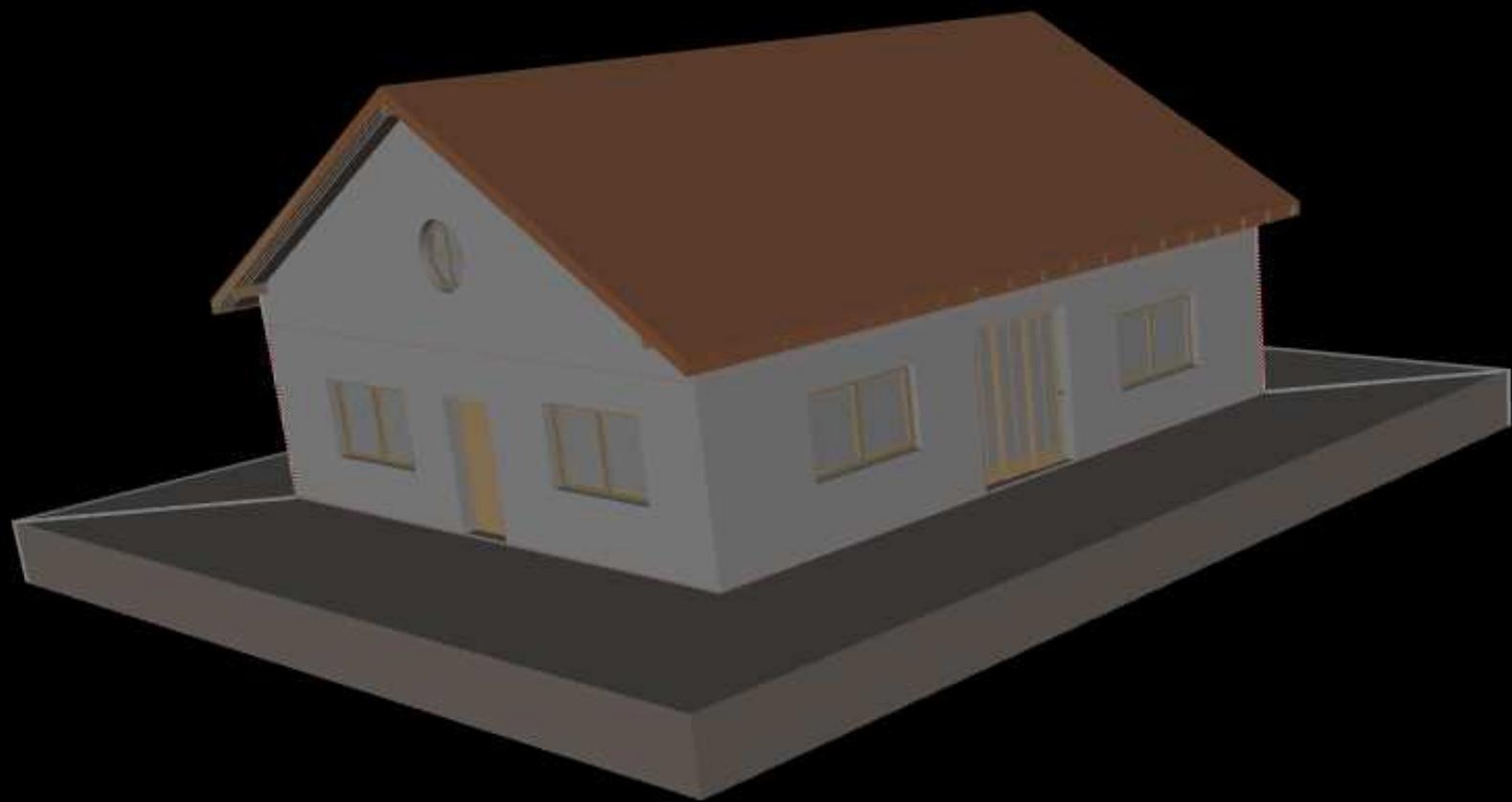
**CONNECT. TRANSFORM. AUTOMATE.**



- View 1 (255)
  - inspector [FFS] (255)
    - Building (1)
    - BuildingFurniture (14)
    - BuildingInstallation (94)
    - BuildingPart (3)
    - Door (29)
    - FloorSurface (4)
    - IntBuildingInstall
    - RoofSurface (2)
    - Room (6)
    - WallSurface (47)
    - Window (46)

BuildingInstallation (94)  
Geometry Type: CompositeSurface  
Geometry Type: Face  
Geometry Type: MultiSurface  
Geometry Type: Aggregate





# Conclusion



FME n'est pas :

- le meilleur logiciel de traitement de nuage de points
- le meilleur logiciel de modélisation 3D BIM

Par contre, c'est l'outil indispensable pour traiter, manipuler et transformer des données multiples et hétérogènes.

**CONNECT. TRANSFORM. AUTOMATE.**



# Conclusion



Données 3D, comment peut-on les diffuser au grand public ? dans quels formats ?

- CityGML
- Three.js (version Beta, à venir pour 2016)
- Guichet cartographique 3D
- OL3-Cesium

CONNECT. TRANSFORM. AUTOMATE.



# Merci de votre attention



- Questions?
- Pour plus d'information
  - [fme@inser.ch](mailto:fme@inser.ch)
  - INSER SA

CONNECT. TRANSFORM. AUTOMATE.



