

WWW.CYBERCITY.TV

Kilian ULM, CyberCity AG - Zurich



EFFICIENT REALITY-BASED 3D CITY MODELING





EFFICIENT REALITY-BASED 3D CITY MODELING

1. CyberCity AG

2. 3D City Modeling – Levels of Geometry

- Photogrammetry (CyberCity-Modeler)
- LIDAR (LIght Detection And Ranging)

3. 3D City Modeling – Levels of Texturing

- Terrestrial Texturing
- Automatic Texturing from Aerial Imagery

4. Excursus: True-Orthophoto vs. Orthophoto

5. Management in ArcGIS 9 (ESRI)

6. VRGIS TerrainView™ (ViewTec AG)

7. Applications

- Urban Planning/GIS
- City Marketing/Tourism
- 3D Landmarks

8. Conclusion



ZURICH - LOS ANGELES

SERVICES

- 3D City Models
- True-Orthophotos
- Digital Terrain Models
- Photogrammetry in General
- www.map2day.at

SOFTWARE SOLUTIONS

- CyberCity-Modeler
- TerrainView (ViewTec AG)
- www.map2day.at

INT. PARTNERS

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

ESRI
partner⁺⁺

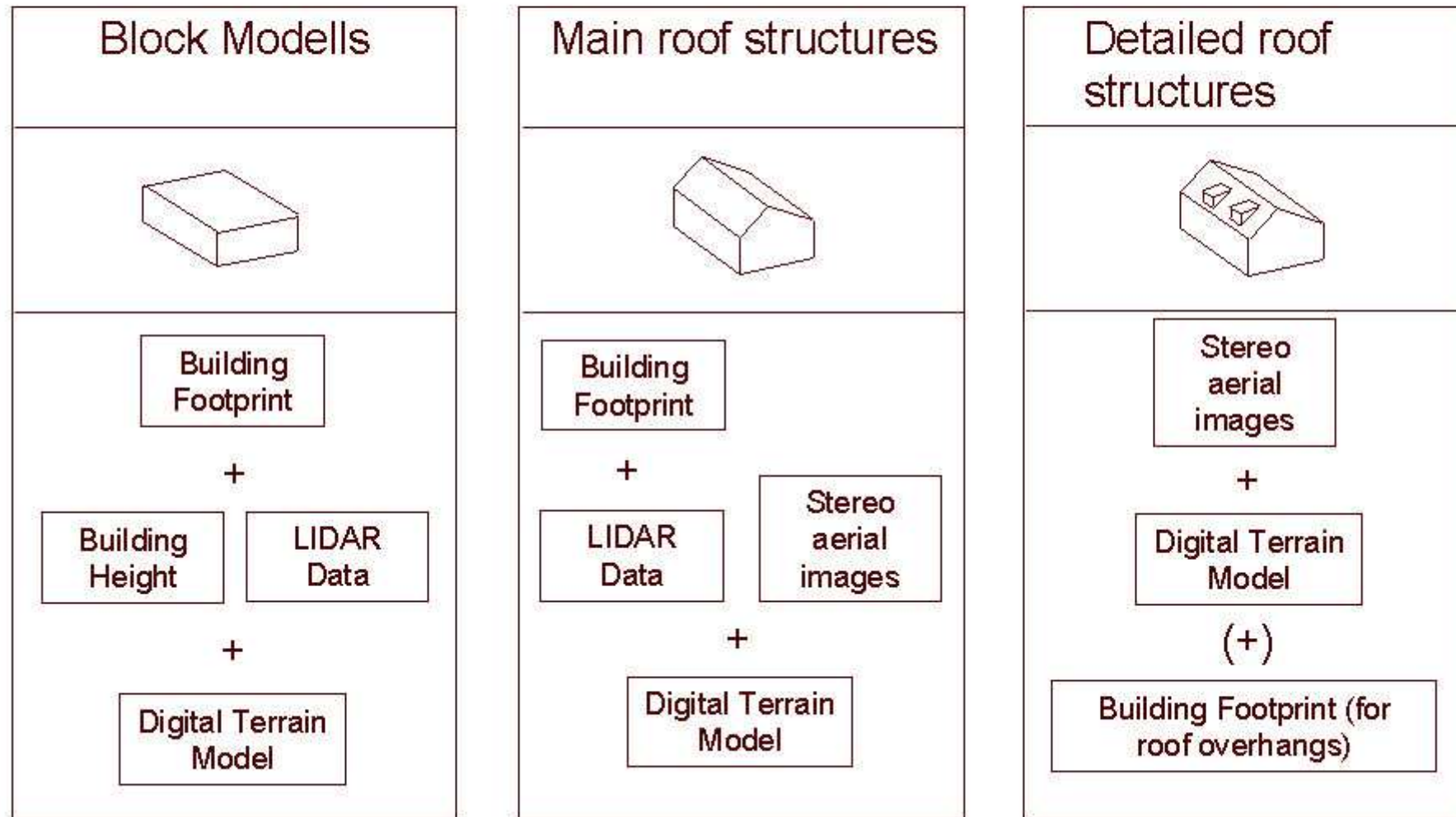
viewtec[®]
the art of virtual reality

fmm
FOREST MAPPING MANAGEMENT

COWI

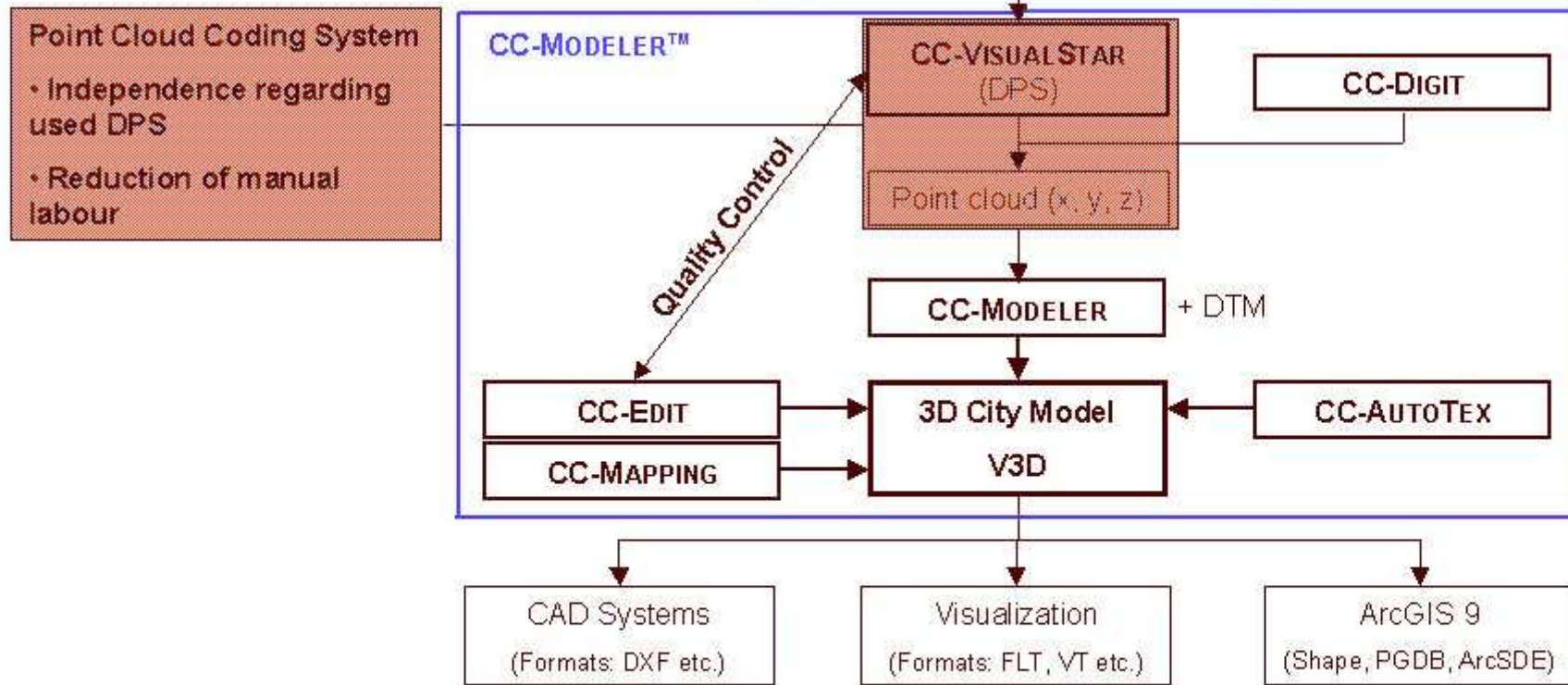
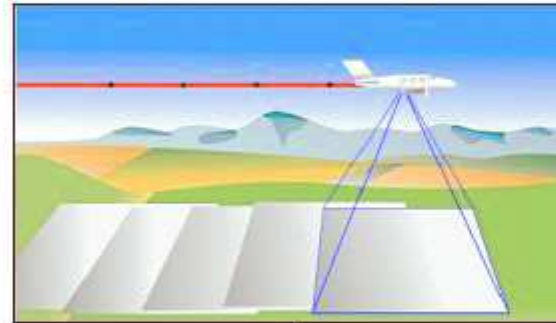
SANBORN

3D CITY MODELING – Levels of Geometry

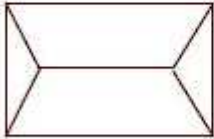

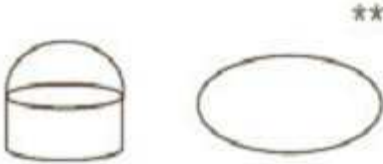
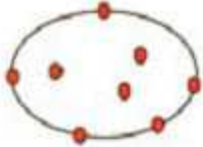

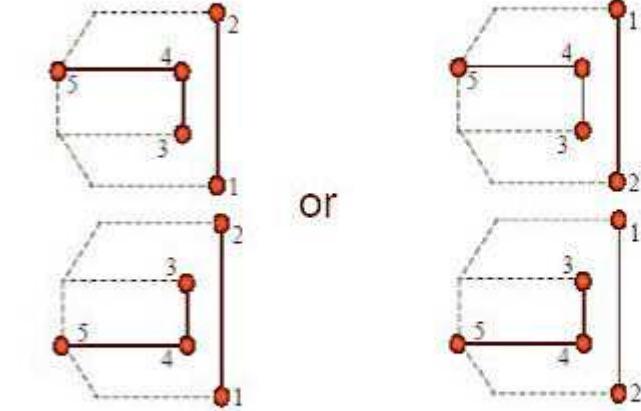


PHOTOGRAMMETRY - CyberCity-Modeler

Semi-automatic building extraction from stereo imagery

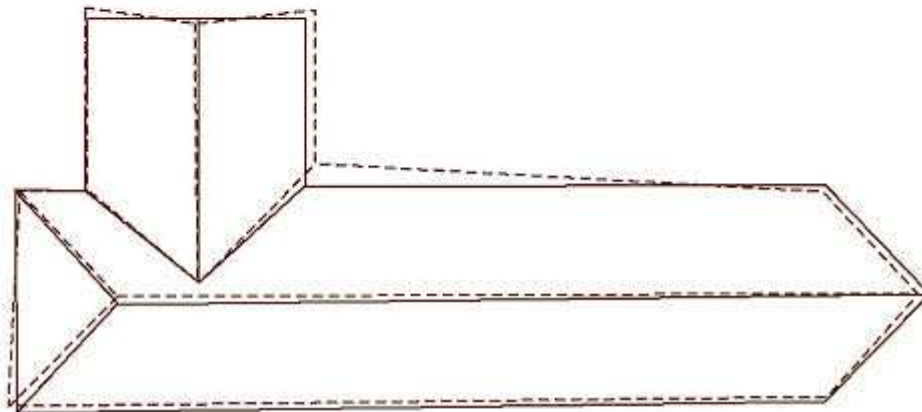


POINT CLOUD CODING SYSTEM

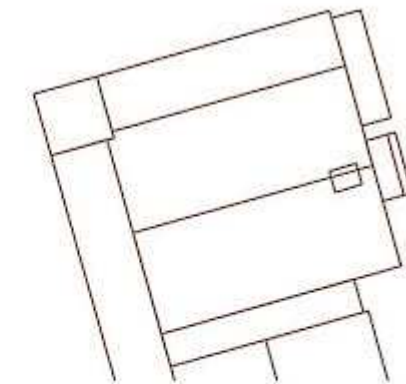
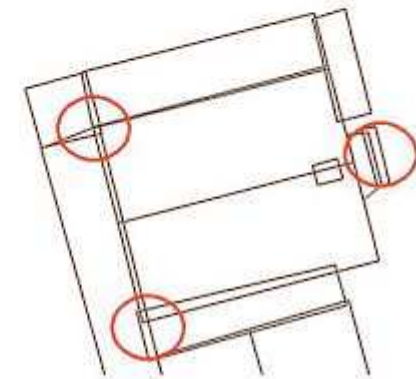
Example	Code	Measurement Rules
	121 or 122	
	548 or 558	
	531 or 532	

CYBERCITY-MODELER (CC-EDIT)

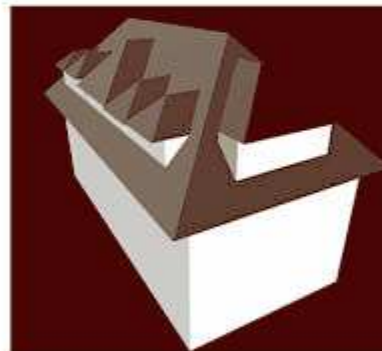
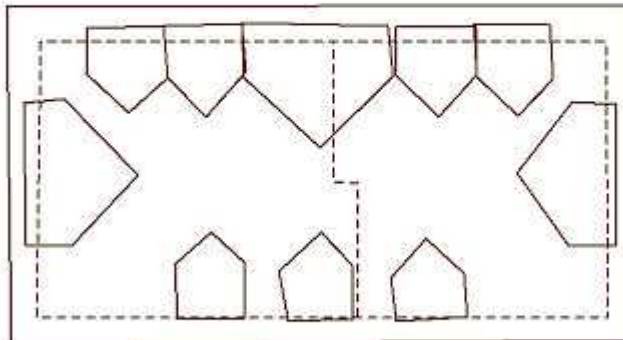
CC-EDIT Improvement of the geometry



Improvement of the geometry (e.g. right angles, parallel lines, planar faces etc.)



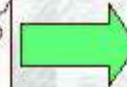
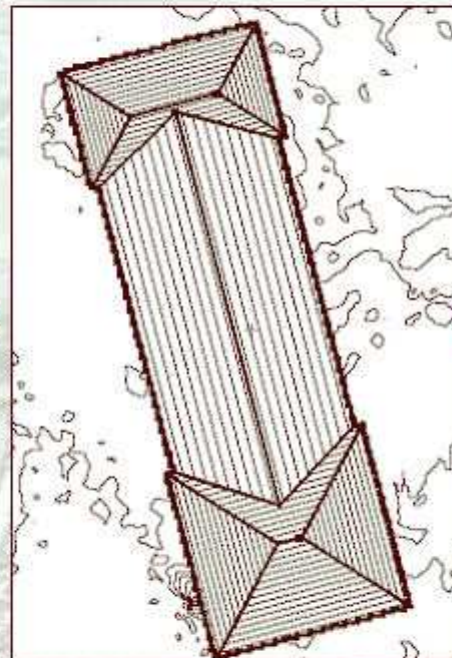
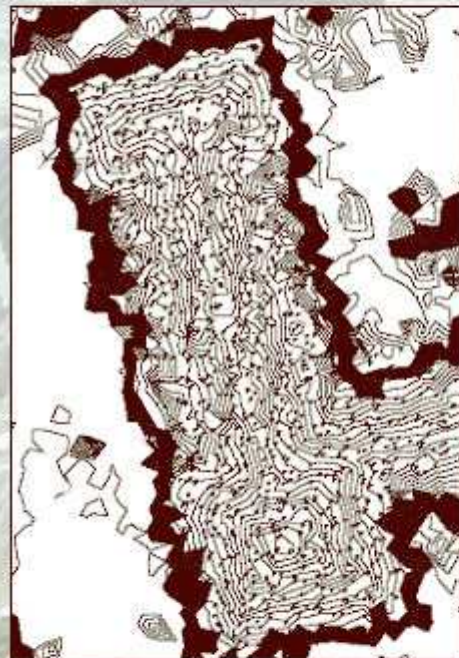
Correction of overlappings and gaps



Overhanging roofs by back projection of the building footprint

3D MAIN ROOFS FROM LIDAR

LASERSCANNER DATA Semi-automatic derivation of main roof structures



3D CITY MODEL



CC-MODELER™

LASERSCANNER DATA
+
BUILDING FOOTPRINTS

DERIVATION OF THE
MAIN ROOF STRUCTURE

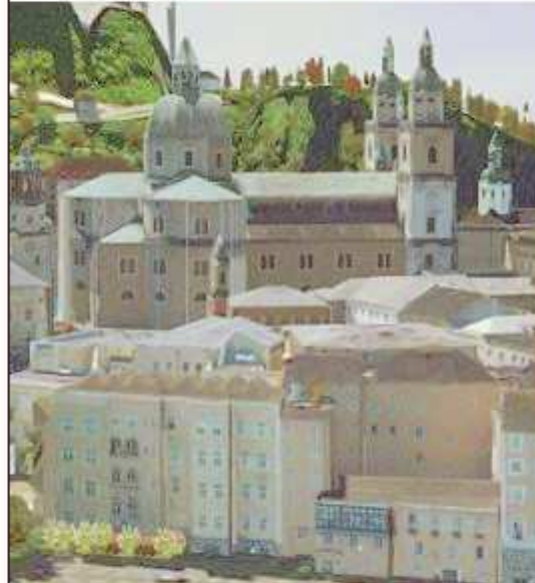
3D CITY MODELING – Levels of Texturing

Generic Texturing



- Texture library
- Not realistic
- Regional texture types
- Automatic

Automatic Texturing



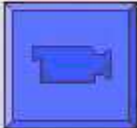
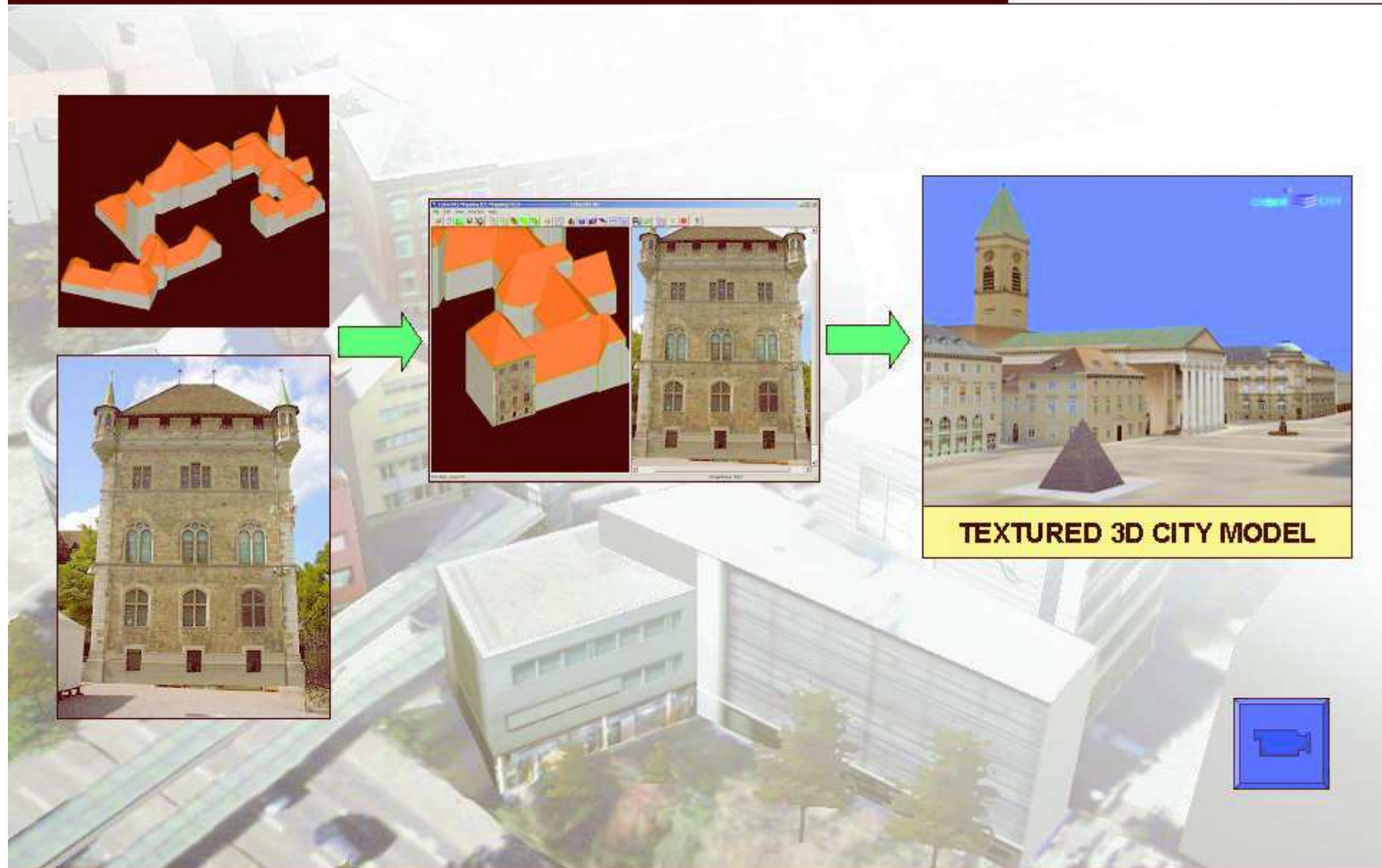
- (Oblique) Aerial Imagery
- Realistic
- Automatic

Terrestrial Texturing



- Digital Photographs
- Realistic/High resolution
- Manually applied

CC-MAPPING – Texturing with terrestrial photographs



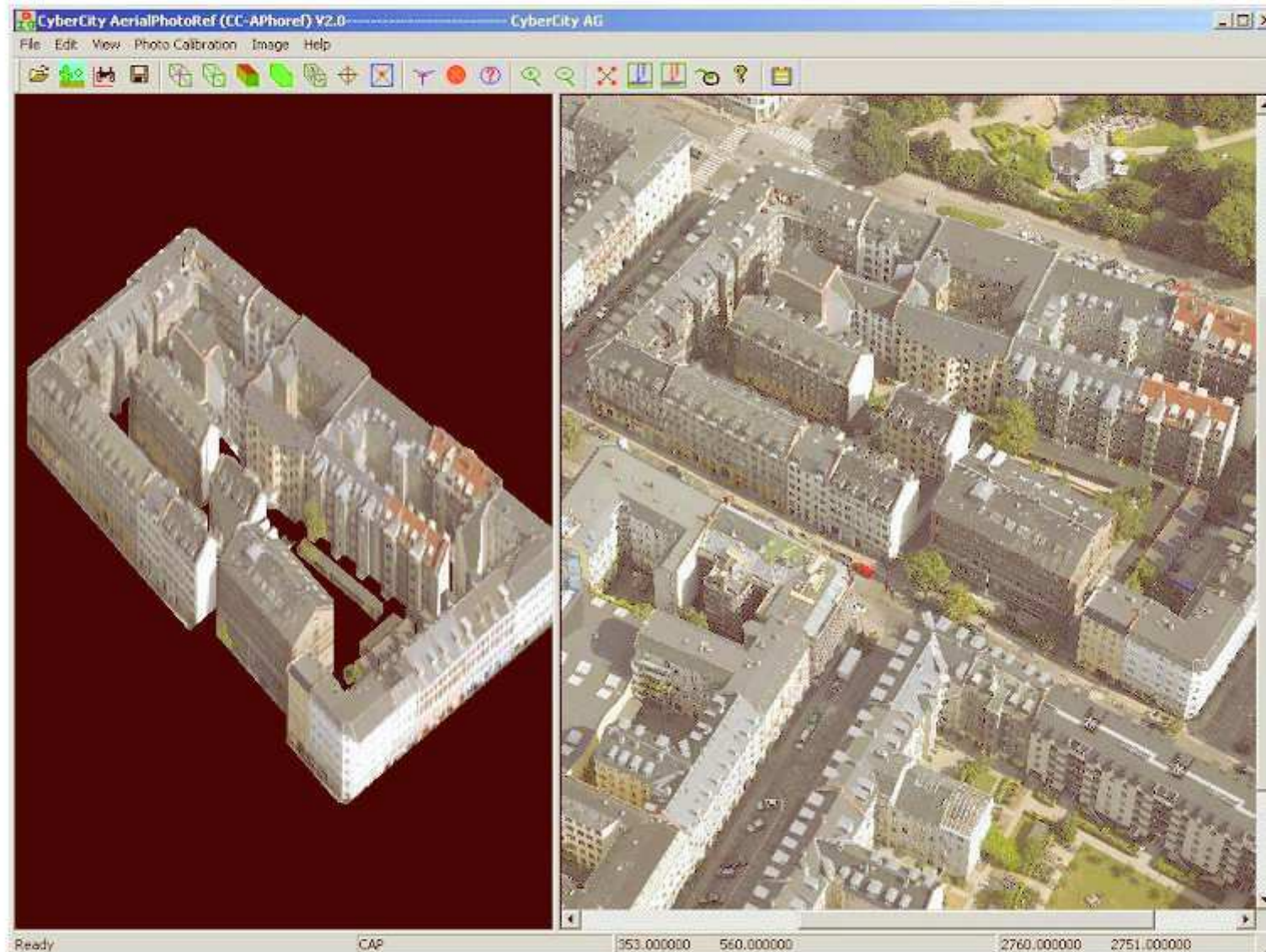
Comparison REALITY - VIRTUALITY

Photograph (TU Munich)

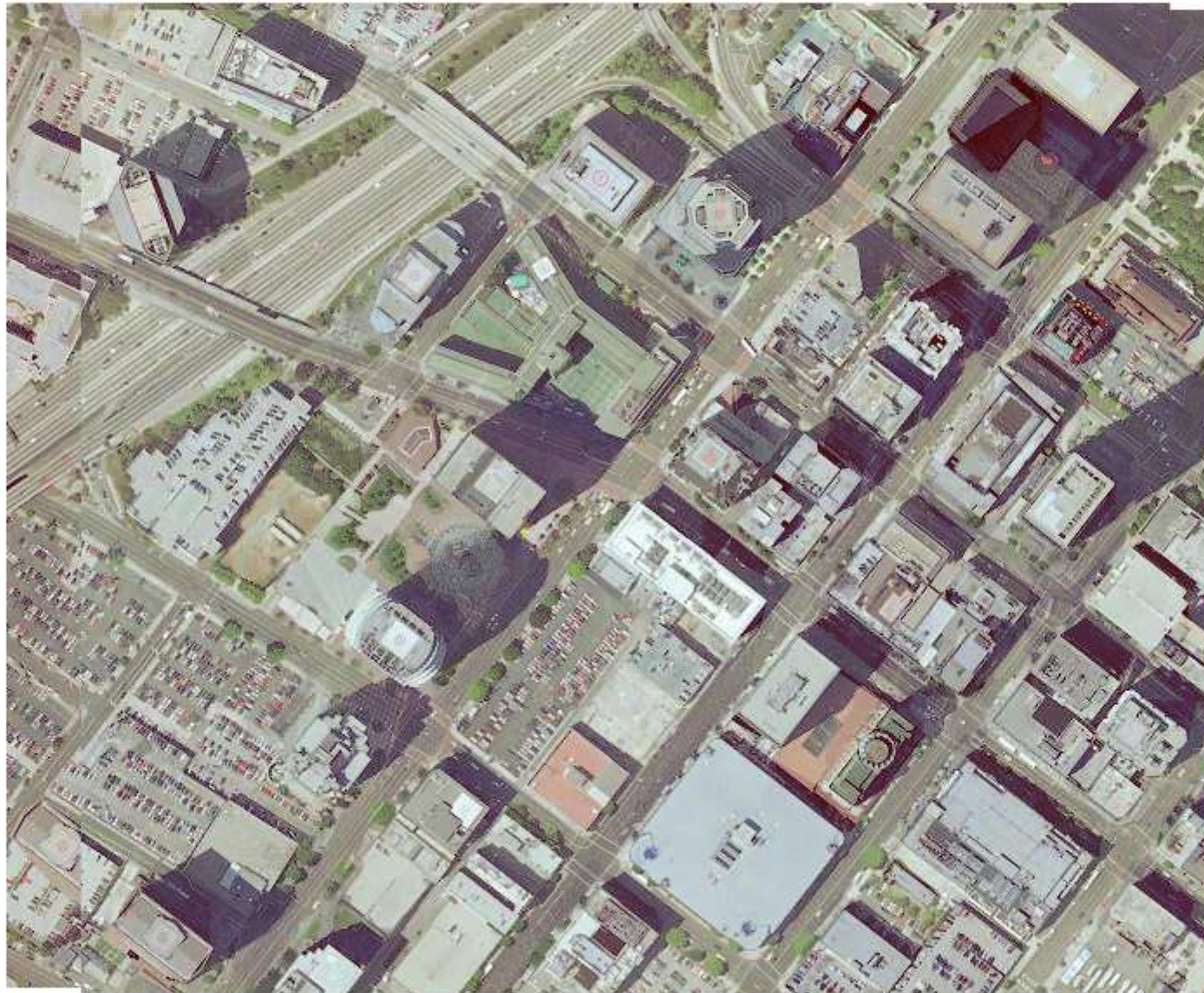


Textured 3D Model (TU Munich)

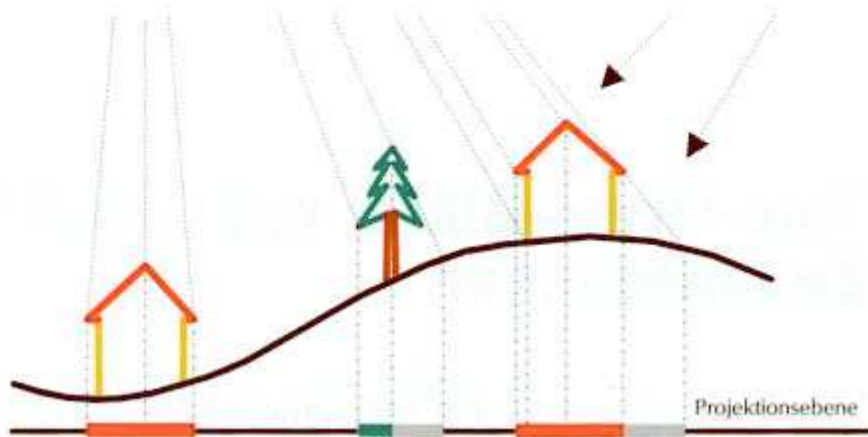
CC-AUTOTEX – Automatic Texturing



EXCURSUS: TRUE-ORTHOPHOTO vs. ORTHOPHOTO

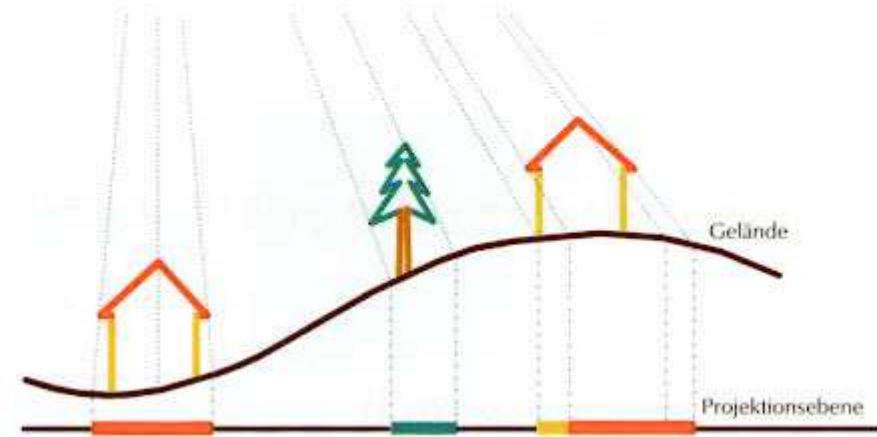


EXCURSUS: TRUE-ORTHOPHOTO vs. ORTHOPHOTO



TRUE-ORTHOPHOTO

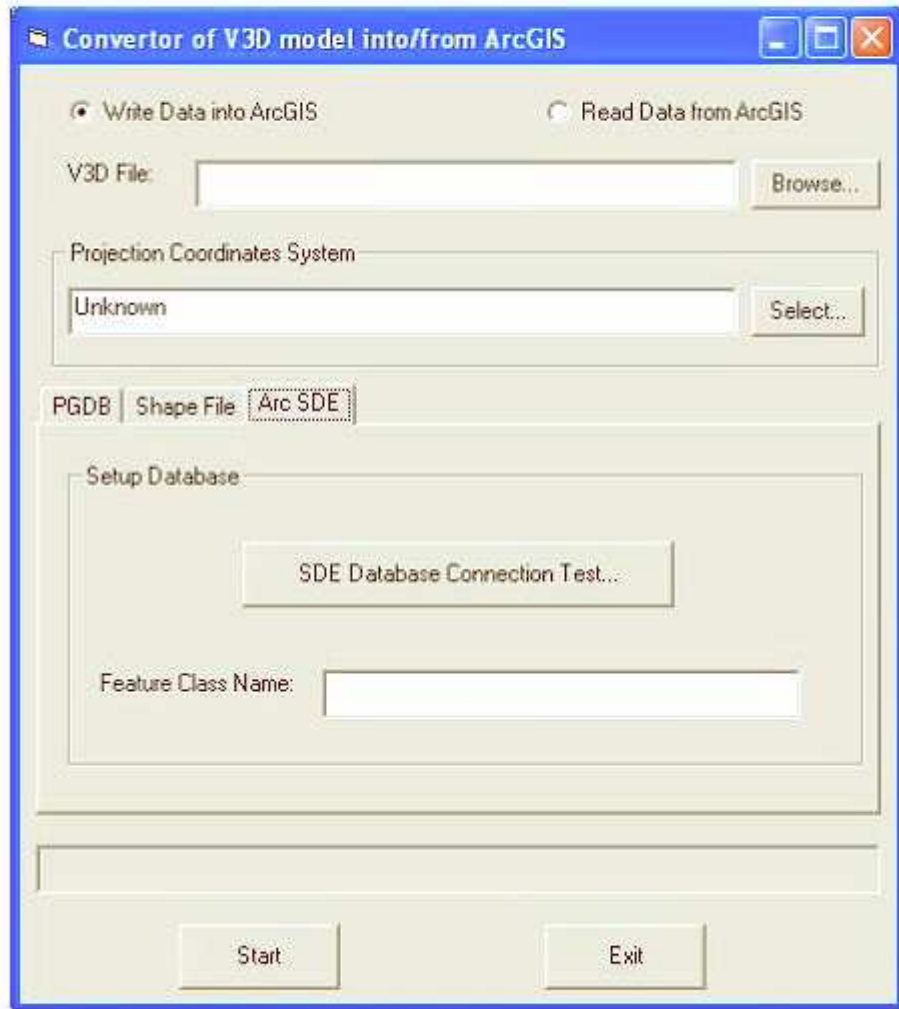
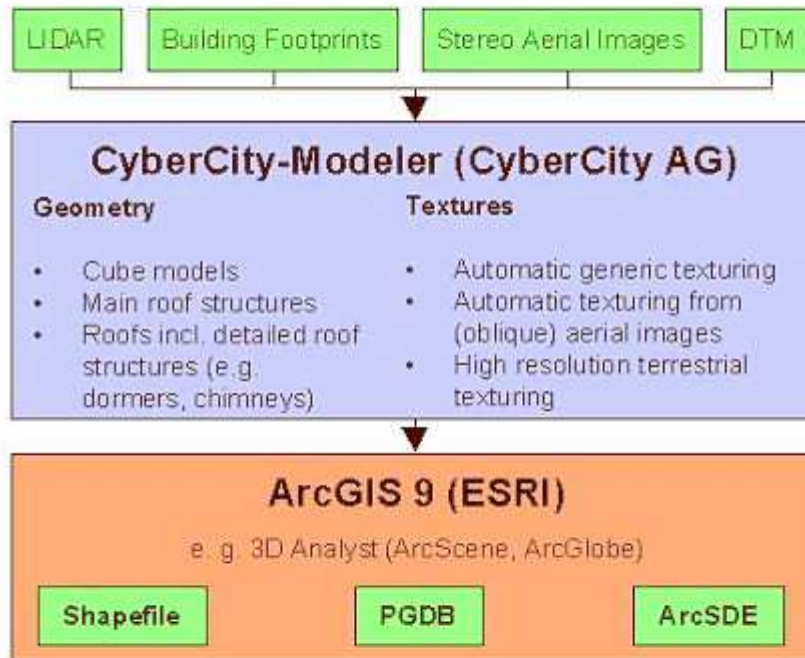
- Rectified using DTM and 3D City Model

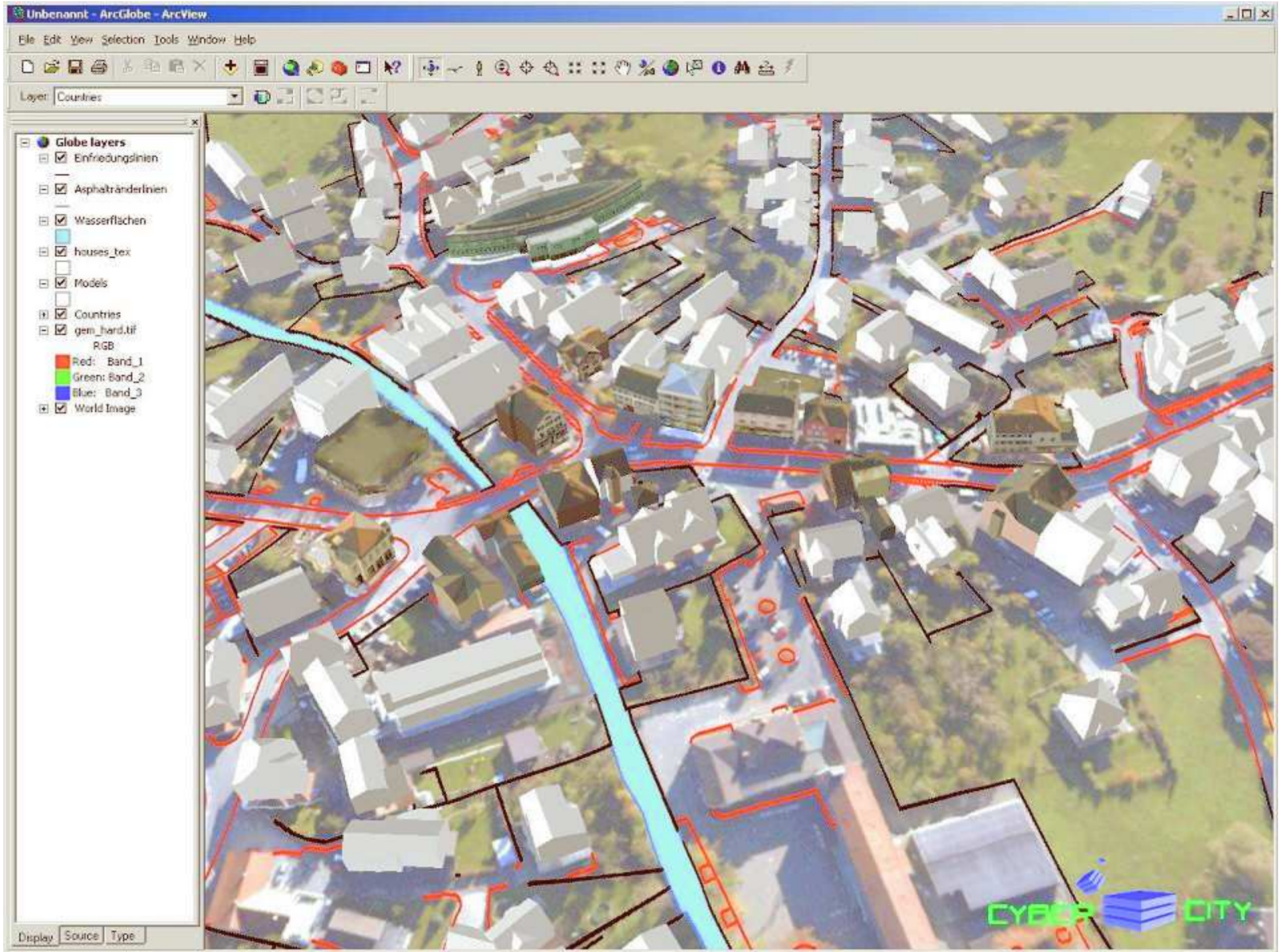


ORTHOPHOTO

- Rectified using DTM

MANAGEMENT in ArcGIS 9 (ESRI)



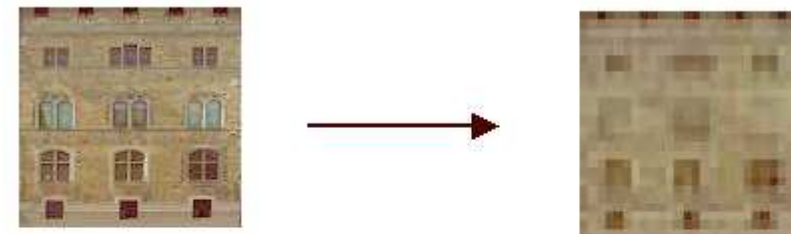
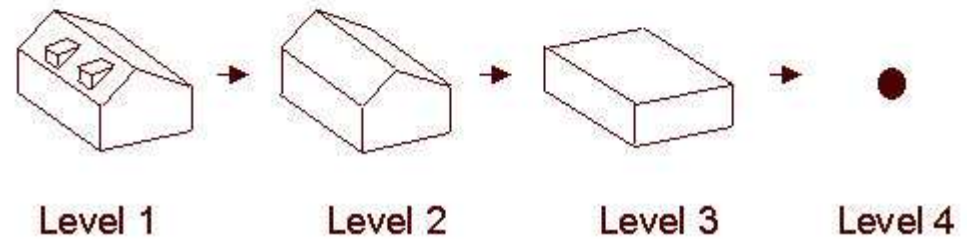


VRGIS TerrainView™ (ViewTec AG)



LEVEL OF DETAIL (LOD)

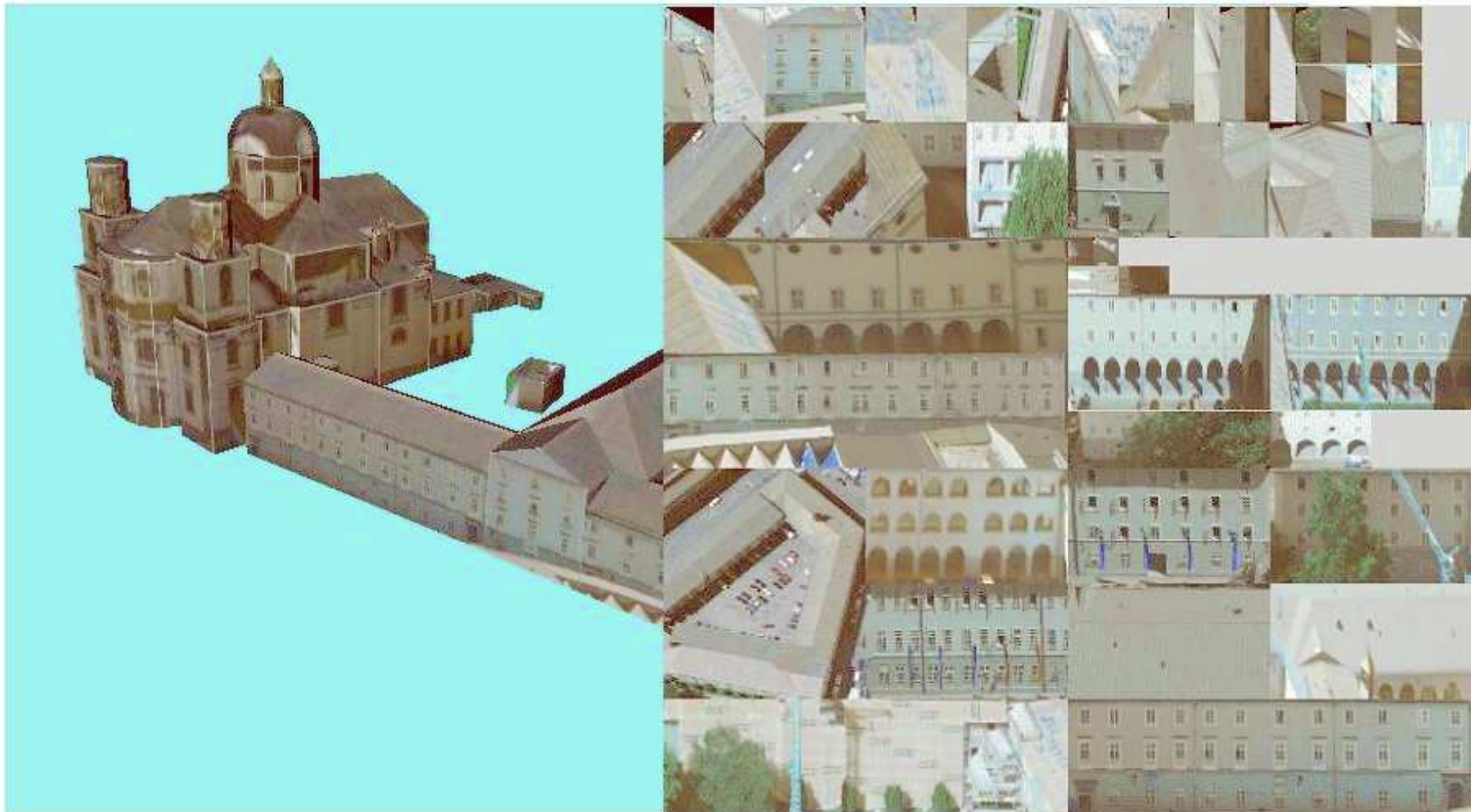
LEVEL OF DETAIL (LOD)



Texture 100 %

Texture 20 %

Texture File Management



URBAN PLANING



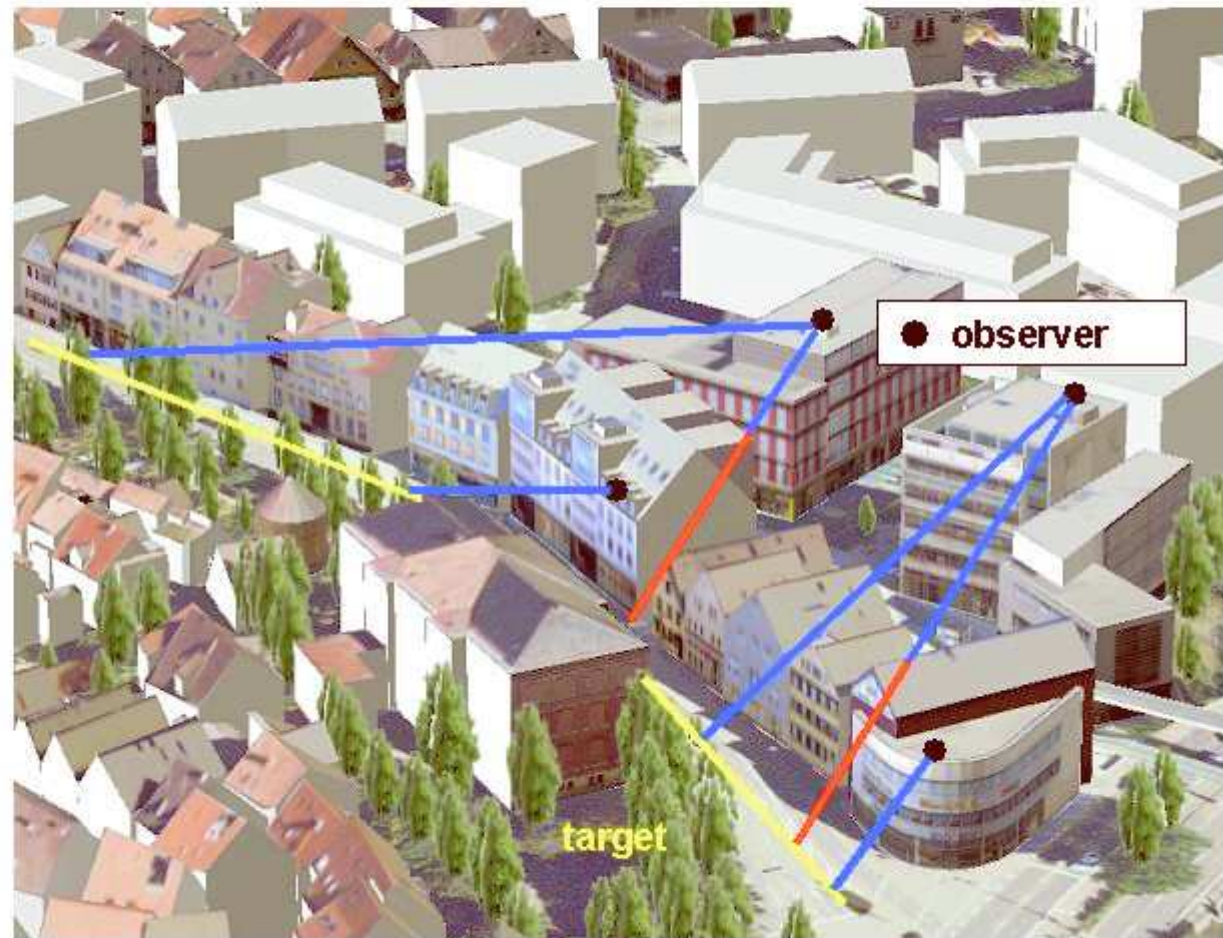
URBAN PLANING

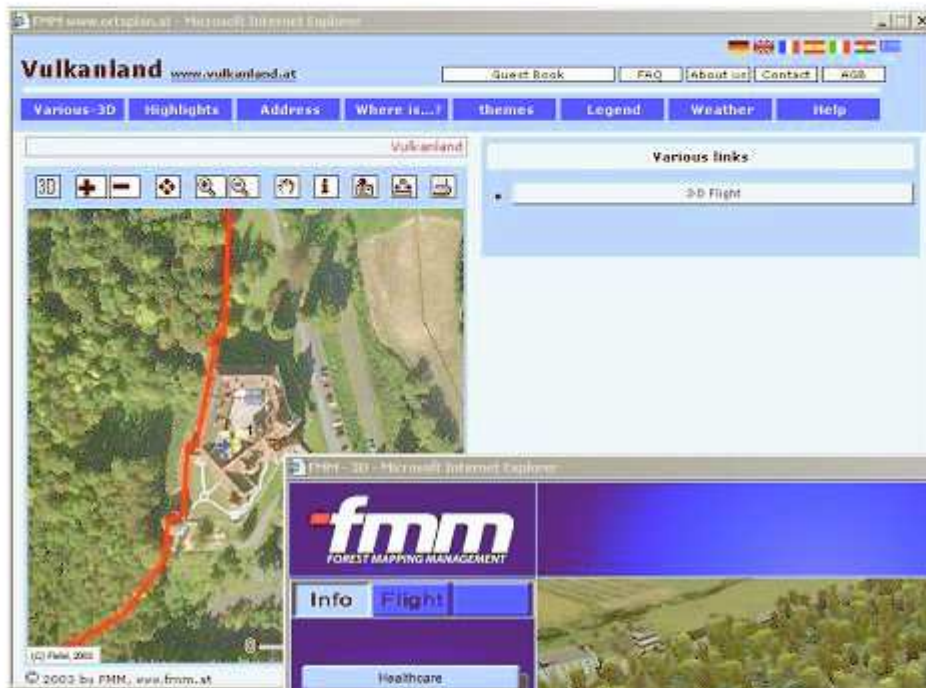


GIS ANALYSIS

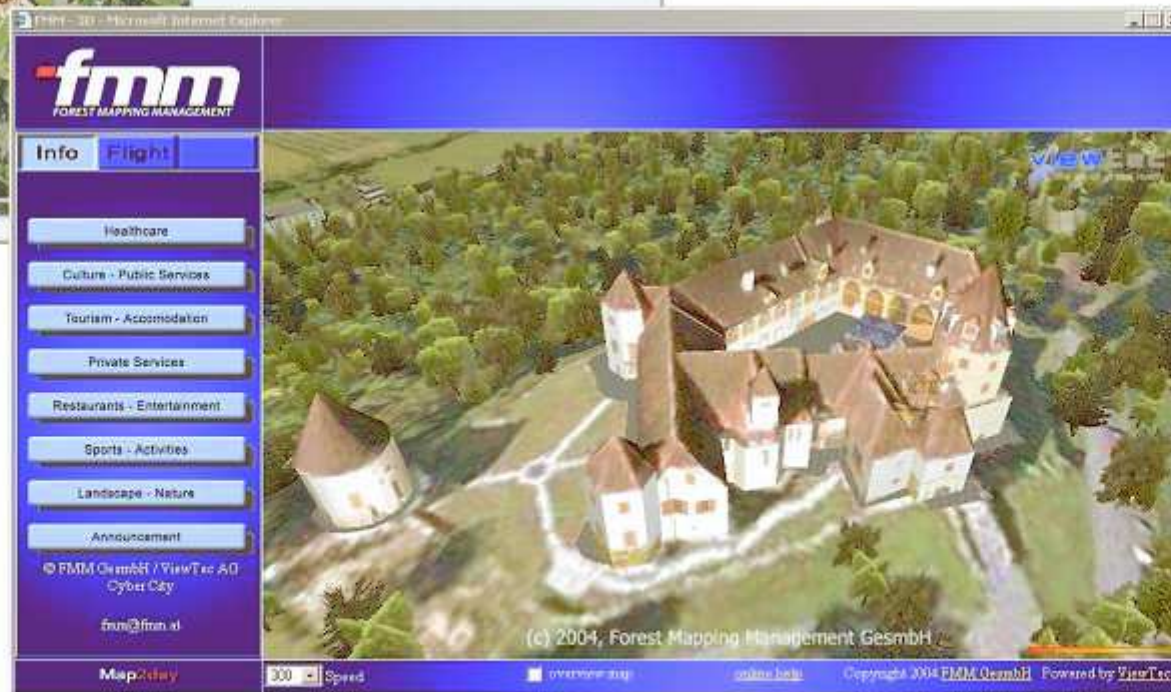
- **Line-of-sight** (e.g. telecommunication, homeland security etc)
- **Analysis/Simulation of flooding**
- **Volumetric calculation**
- **Polution transmission**

- target
- line-of-sight
- line-of-sight occluded





www.map2day.at



3D LANDMARKS



3D LANDMARKS





- **Combination of Level** of Geometry and Texturing
- **Quality Assurance and Consistency** with 2D data
- **Automatic Texturing** as a cost-effective alternative
- Management and Use in ArcGIS (ESRI) – **3D GIS**
- Real Applications in **Urban Planning and Public Communications**
- **Interdisciplinary** Applications (Planning, Marketing, GIS etc.)



THANK YOU!

Kilian ULM, kulm@cybercity.tv



CyberCity AG
Schaffhauserstr. 481
P.O. Box
CH 8052 Zurich
SWITZERLAND

WWW.CYBERCITY.TV



CyberCity 3D LLC
222 N. Sepulveda
Suite 1800
El Segundo CA 90245
USA

WWW.CYBERCITYLLC.COM