3D CARTOGRAPHIC MODELLING IN EDUCATIONAL PROCESS

Temenoujka Bandrova
University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria
Summary

Introduction
The Laboratory on Cartography
Technologies
The students projects for 3D mapping – realizations and decisions
Results and plans for future works
Introduction

About 20% of all students, studying geodesy - specialize cartography

Diploma theses on cartographic thematic

Using their knowledge and practical skills in geodesy and photogrammetry for realization of diploma theses

3D mapping – one of the most attractive topics

Technology development, solving problems, 3D mapping of different objects
The Laboratory on cartography

Modernized on the base of a project of the Department of photogrammetry and cartography on a theme “Remote Sensing and mobile spatial data infrastructure”

Hardware with high capacity and a list of software: CAD, GIS, image processing, map design and 3D modules of the most world famous software companies and the necessary hardware

Training school on 3D Urban Visualisation; Open Web Technologies. The course lasted 40 hours and the keynote speaker was Assoc. Prof. Dr. Sisi Zlatanova, TU Delft
The Laboratory on cartography

Training school on 3D Urban Visualisation; Open Web Technologies.

The course lasted 40 hours and the keynote speaker was Assoc. Prof. Dr. Sisi Zlatanova, TU Delft
Technologies

- Preparation of sources for map creation;
- Converting of sources in digital form;
- Including third coordinates;
- Reconstruction of digital terrain model (DTM);
- Designing of main contents (buildings, streets, etc.);
- 3D symbolization of the 3D Map
- Preparation of photo textures;
- Photo-realistic visualization of 3D map.
Technologies

Data Gathering for Model Construction
Data Vectorising
Construction of Digital Terrain Model
Modeling of Objects from the Situation
Adding Textures and Lights

3D map for publishing
Virtual animated map
3D map for Internet Application

Photorealistic visualization
Choosing camera and path
Създаване на VRML файл

Creation of a 2D symbolic system
Configuration of Settings and tools
Programming of Interactive Application

Rendering of 3D map
Creation of animated map / video file
Export of Java applet

“3D Multifunctional Cartographic Model”
Two aspects of cartography are considered: visualization and symbol system which transform the 3D model to the 3D map for paper publishing.
To animate the movement of the camera we need to create a way on the 3D model and later we should set the movement.
The advantage of it is the relative autonomy of its platform and its availability in the World Wide Web. Hyperlinks can be integrated in both VRML and HTML data.
The students projects for 3D mapping – realizations and decisions

3D mapping for architectural applications

Students should find practical application of their 3D map. This model is created in Laboratory on cartography but it is used in Faculty of Architecture for situation of new designed buildings (Diploma Theses of Kremena Boyanova).

based on precise geodetic measurements and accurate modelling of the environment and the result gives possibility to architects to understand the territory better before new buildings modelling
The students projects for 3D mapping – realizations and decisions

3D mapping for architectural applications

Students should find practical application of their 3D map. This model is created in Laboratory on cartography but it is used in Faculty of Architecture for situation of new designed buildings (Diploma Theses of Kremena Boyanova).

based on precise geodetic measurements and accurate modelling of the environment and the result gives possibility to architects to understand the territory better before new buildings modelling
If the object is a building, the task for measuring is not difficult for students in geodesy field. The task is not so easy, if the object has complicated shape, like a monument.
3D mapping of monuments:
Laser scanning is used for modelling of a monument scale-model, 3D city map of central part of Vratca city, Bulgaria
(Diploma Theses of Alexandra Todorova)
The students projects for 3D mapping – realizations and decisions

Using a free version of SketchUp as 3D modeling software, students find decisions for different problems, mainly of texturing of the buildings and their situation in virtual environment.

Because of not enough good accuracy of terrain model in Google Earth very often students should create additionally platform for building situation.
The students projects for 3D mapping – realizations and decisions

Google Earth application

The last year 18 students in specialization cartography and those ones who had chosen 3D modelling for elected subject had a task about building a model for Google Earth.

Such projects provoke students’ thinking to choose the best, fast and attractive way for building modeling. They exchange ideas and solutions about problems appeared in their work.
Results and plans for future works

Very often we need to find cheap and easy decision being part of diploma theses. The aim of the projects is to find more workable applications, for example:

- in the field of early warning and crisis management;
- programming and describing automatic solutions of 3D models and maps;
- find more graphical applications on the base of measurements in 3D maps;
- propose different research and proposals for best and fast solutions in 3D map making.

As final step of visualization of 3D maps, students present animated models of the represented region. This fact gives of their diploma theses presentation finalization of their work.
INVITATION

5th International Conference on Cartography and GIS

&

Seminar with EU cooperation on Early Warning and Disaster Management

15.-21. 06. 2014

Riviera, Varna, BULGARIA
Topics

Conference

- Cartography Concepts in BigData Environment
- GIS Technologies and Related Disciplines
  - Web Cartography and Digital Atlases
    - Map Design and Production
    - Cartographic Visualization
  - Volunteer Geographic Information
  - Virtual Geographic Environment
- Cartography and GIS in Education; GPS Technologies
- Contemporary problems using geodetic coordinate systems and map projections
- Geospatial data acquisition by remote sensing technologies for cartographic purposes
- GIS for Geology and Natural Sciences

Seminar with EU Cooperation on Early Warning & Disaster / Crisis Management

- European Concepts for CM and EW
- Visualization of Geodata and Geoinformation in CM and EW
  - User Needs and Context Mapping
- From Discovery to Full Interoperability in CM and EW
- SDI and CM: INSPIRE Influence
- "Speaking the Same Language - Semantic Aspects of CM"
- Sensor Mapping for EW and CM
The best papers will be propose for publication in a Book titled: **Thematic Cartography for Society**

Publisher: **Springer**

Book topics:

- User-friendly Internet Cartography
- User-oriented Map Design and Production
- Context-oriented Cartographic Visualization
- Map interfaces for Volunteered Geographic Information
- Sensing Technologies and their integration with Maps
- Cartography in Education

On-line publication

CD Publication, ISSN

**Abstract/ paper submission Deadline:**

10. January 2014
Thanks, You are welcome to Bulgaria!

**Riviera Holiday Club** is a former governmental residence, situated at a distance of 17 km from the city of **Varna** (27 km from Varna airport), in the close proximity of **Golden Sands** resort.

It lies straight onto the shore, with own beaches in cosy bays and amid a lovely park of centuries-old trees. The provided peace, quietness and comfort make **Riviera Holiday Club** an attractive place for many international events.

**5th International Conference on Cartography and GIS**

&

Seminar with EU cooperation on Early Warning and Disaster Management

15-21. 06. 2014

**Riviera, Varna, BULGARIA**

www.cartography-gis.com