ISPRS Conference
International Conference on 3D Geoinformation
Berlin, Germany
November 3 - 4, 2010

Editors
Kolbe, Thomas H.; König, Gerhard; Nagel, Claus

Organisers
ISPRS WG IV/8 “3D Spatial Data Integration for Disaster Management and Environmental Monitoring”
Open Geospatial Consortium, Inc. (OGC), European Spatial Data Research (EuroSDR),
German Society for Photogrammetry, Remote Sensing and Geoinformation (DGPF),
Technische Universität Berlin
ISPRS Commission IV – Working Group 8
International Conference on 3D Geoinformation

Berlin, Germany
November 3 - 4, 2010

Editors
Thomas H. Kolbe
Gerhard König
Claus Nagel

ISSN 1682-1750
Program and Conference Chair

Thomas H. Kolbe, Technische Universität Berlin, Germany

Program Committee

Alias Abdul-Rahman Universiti Teknologi Malaysia
Roland Billen University of Liège, Belgium
Lars Bodum Aalborg University, Denmark
Martin Breunig University of Osnabrück, Germany
Eliseo Clementini University of L’Aquila, Italy
Volker Coors University of Applied Sciences Stuttgart, Germany
Jürgen Döllner University of Potsdam, Germany
Thomas H. Kolbe Technische Universität Berlin, Germany
Philippe de Maeyer Ghent University, Belgium
Claudine Métral University of Geneva, Switzerland
Christopher M. Gold University of Glamorgan, United Kingdom
Gerhard Gröger University of Bonn, Germany
Gerhard Joos NATO C3 Agency, The Netherlands
Hugo Ledoux Delft University of Technology, The Netherlands
Jiyeong Lee University of Seoul, South Korea
Ki-Joune Li Pusan National University, South Korea
Fred Limp University of Arkansas, USA
Marc-Oliver Löwner Technische Universität Braunschweig
Hui Lin Chinese University of Hong Kong, China
Stephan Nebiker University of Applied Sciences, Switzerland
Anders Östman University of Gävle, Sweden
Norbert Pfeifer Vienna University of Technology, Austria
Jacynthe Pouliot Université Laval, Québec, Canada
Carl Reed Open Geospatial Consortium, USA
Massimo Rumor University of Padova, Italy
Monika Sester University of Hannover, Germany
Uwe Stilla Technische Universität München, Germany
André Streilein Swisstopo, Switzerland
Rod Thompson Queensland Government, Australia
Peter van Oosterom Delft University of Technology, The Netherlands
George Vosselman ITC Enschede, The Netherlands
Peter Woodsford Snowflake Software, United Kingdom
Mike Worboys University of Maine, USA
Qing Zhu Wuhan University, China
Alexander Zipf University of Heidelberg, Germany
Sisi Zlatanova Delft University of Technology, The Netherlands

Workshop Organising Committee

ISPRS Working Group IV/8 (Sisi Zlatanova, Delft University of Technology, The Netherlands)
Open Geospatial Consortium, Inc. (OGC)
European Spatial Data Research EuroSDR
German Society for Photogrammetry, Remote Sensing and Geoinformation (DGPF)
Technische Universität Berlin, Germany

Local Organising Committee

Thomas Becker, Andreas Fuls, Javier Herreruela, Robert Kaden, Gerhard König, Andreas Krüger, Rosemarie Kunkel, Hartmut Lehmann, Alexandra Lorenz, Claus Nagel, Bernd Stary, Sven Weisbrich
Technische Universität Berlin, Germany

5th International 3D GeoInfo Conference, November 3-4, 2010, Berlin, Germany
Preface

The 3D Geoinformation Conference aims at bringing together international researchers from academia, industry and government. Researchers and companies are invited to present and discuss their activities to an international forum of experts in the field of 3D geoinformation.

The 5th 3D GeoInfo Conference took place at the Technische Universität Berlin, Germany, from November 3-4, 2010. It was jointly organised by ISPRS Commission IV, Working Group 8, Open Geospatial Consortium, Inc. (OGC), European Spatial Data Research EuroSDR, German Society for Photogrammetry, Remote Sensing and Geoinformation (DGPF), and Technische Universität Berlin, Germany.

Researchers were invited to submit full papers or extended abstracts describing original and unpublished fundamental scientific research. From the numerous contributions received by the program committee, the most valuable were selected in a double-blind review process for oral and poster presentation. Thus, the conference provided an excellent overview of the current status and future developments of various aspects of research, education and practical application in the field of geoinformation, remote sensing, and photogrammetry.

The Proceedings Volume is arranged in 3 parts:

Part 1: Oral presentations
Part 2: Poster presentations
Part 3: Abstracts of selected oral presentations from the full paper track to be published in the Lecture Notes in Geoinformation and Cartography series (Springer Verlag).

On behalf of the organizing committee we would like to thank all authors for contributing their papers to the 5th 3D GeoInfo Conference and wish a successful continuation of this well-received conference series in future.

Thomas H. Kolbe
Gerhard König
Claus Nagel
# Table of Contents

## Part 1

**DEVELOPING A FRAMEWORK FOR MALAYSIAN 3D SDI**  
*Alias Abdul-Rahman; Behnam Alizadehashrafi; Volker Coors* ................................................................. 3

**CONCEPT FOR BUILDING LICENSING BASED ON STANDARDISED 3D GEO INFORMATION**  
*Joachim Benner; Andreas Geiger; Karl-Heinz Hägele* ................................................................................. 9

**TOWARDS AN AUTOMATED HEALING OF 3D URBAN MODELS**  
*Jürgen Bogdahn; Volker Coors* .................................................................................................................... 13

**FROM GIS TO BIM AND BACK AGAIN – A SPATIAL QUERY LANGUAGE FOR 3D BUILDING MODELS AND 3D CITY MODELS**  
*Andre Borrmann* ........................................................................................................................................ 19

**ENRICHING A 3D WORLD WITH SYNTHETIC AND VISIBLE INFORMATION ABOUT THE DISTRIBUTION OF POINTS OF INTEREST**  
*Mickaël Brasebin; Bénédicte Bucher; Charlotte Hoarau* .............................................................................. 27

**ESTIMATION OF THE ENERGETIC REHABILITATION STATE OF BUILDINGS FOR THE CITY OF BERLIN USING A 3D CITY MODEL REPRESENTED IN CITYGML**  
*Daniel Carrión; Alexandra Lorenz; Thomas H. Kolbe* ............................................................................... 31

**AUTOMATIC LANDMARK DETECTION FOR 3D URBAN MODELS**  
*Julia Ganitseva; Volker Coors* .................................................................................................................... 37

**BIM FOR GEO-ANALYSIS (BIM4GEOA): SET UP OF 3D INFORMATION SYSTEM WITH OPEN SOURCE SOFTWARE AND OPEN SPECIFICATION (OS)**  
*Ihab Hijazi; Manfred Ehlers; Sisi Zlatanova* ................................................................................................. 45

**A NEW METHOD FOR INTERFACING 3D SIMULATION SYSTEMS AND OBJECT-ORIENTED GEO DATA SOURCES**  
*Martin Hoppen; Jürgen Rossmann; Michael Schluse; Ralf Waspe* ................................................................. 51

**A CONCEPT FOR ASSIGNMENT OF TEXTURES TO PARTIALLY OCCLUDED FACES OF 3D CITY MODELS STORED IN CITYGML**  
*Dorota Iwaszczuk; Uwe Stilla* ...................................................................................................................... 57

**TOWARDS A 3D GEO-INFORMATION STANDARD IN THE NETHERLANDS**  
*Jantien Stoter; Marcel Reuvers; George Vosselman; Joris Goos; Leon van Berlo; Sisi Zlatanova; Edward Verbree; Rick Klooster* .................................................................................................................. 63

**DELAUNAY TETRAHEDRALIZATIONS - HONOR DEGENERATED CASES**  
*Edward Verbree* ............................................................................................................................................ 69

**DYNAMIC FEATURES IN A 3D CITY MODEL AS AN ENERGY SYSTEM**  
*Wan Wen; Erik Kjens; Lars Bodum; Jan Kolar* ............................................................................................... 73

## Part 2

**RETRIEVING INFORMATION THROUGH NAVIGATING IN HISTORICAL BAALBEK**  
*Ahmed Alamouri; Laura Pecchioli* ............................................................................................................... 81

**GENETIC ALGORITHM-AIDED ROUTING ON 3D DYNAMIC NETWORKS**  
*Ümit Atila; İsmail Rakıp Karas* ....................................................................................................................... 87

**4-DIMENSIONAL GEOLOGICAL MODELLING OF THE SKELLEFTE DISTRICT, SWEDEN**  
*Tobias Erich Bauer; Saman Tavakoli; Mahdieh Dehghannejad; Maria Garcia; Pär Weihed* ......................... 93

**ONTOLOGICAL IMPEDANCE IN 3D SEMANTIC DATA MODELING**  
*Eliseo Clementini* ....................................................................................................................................... 97

**3D-CAPABILITIES REQUIRED BY USERS OF THE 2D-LARGE SCALE TOPOGRAPHIC REFERENCE DATABASE IN FLANDERS, BELGIUM**  
*Ine De Cubber; Jos Van Orshoven* ............................................................................................................... 101
GIRAPIM. A 3D INFORMATION SYSTEM FOR SURVEYING CULTURAL HERITAGE ENVIRONMENTS
Javier Finat; Francisco J. Delgado; Ruben Martinez; Antonio Hurtadoa ..........................................................107

GEOMETRIC DATA STRUCTURES AND ANALYSIS IN GIS: ISO 19107 CASE STUDY
Axel François; Romain Raffin; Marc Daniel ........................................................................................................115

OPEN ISSUES IN BRINGING 3D TO LOCATION BASED SERVICES (LBS) –
A REVIEW FOCUSING ON 3D DATA STREAMING AND 3D INDOOR NAVIGATION
Marcus Goetz; Alexander Zipf ............................................................................................................................121

EXTENSION OF SEA CHARTS FOR 3D VISUALIZATION
Kristine Haase; Reinhard Koch ..........................................................................................................................125

IMPLEMENTATION OF A 3D GIS IN INTERNET ENVIRONMENT
Chokri Koussa; Mathieu Koehl ............................................................................................................................129

MOBILE MAPPING SYSTEM LIDAR DATA FRAMEWORK
Paul Lewis; Conor McElhinney; Bianca Schön; Tim McCarthy ........................................................................135

3D RECONSTRUCTION AND MODELING OF CELESTIAL BODIES
Ghada H. Machtoub ............................................................................................................................................139

BEYOND VISUALISATION – 3D GIS ANALYSES FOR VIRTUAL CITY MODELS
Julia Moser; Florian Albrecht; Bernhard Kosar .................................................................................................143

INCORPORATING 3D-GIS SPATIAL OPERATOR WITH BUILDING INFORMATION MODELS IN
CONSTRUCTION MANAGEMENT USING GEO-DBMS
Ivin Amri Musliman; Alias Abdul-Rahman; Volker Coors ............................................................................147

DEFINING SPATIAL NEIGHBORHOODS FOR 3D TOPOLOGICAL ANALYSIS
IN INDOOR SPACE
Inhye Park; Jiyeong Lee ....................................................................................................................................155

DECISION SUPPORT SYSTEMS USING 3D OGC SERVICES AND INDOOR ROUTING –
EXAMPLE SCENARIO FROM THE OWS-6 TESTBED
Arne Schilling; Marcus Goetz ...........................................................................................................................159

AN OPTIMIZED WORKFLOW FOR PROCESSING AIRBORNE LASERSCAN DATA
IN A GIS-BASED ENVIRONMENT
Cornelis Stal; Philippe De Maeyer; Alain De Wulf; Timothy Nuttens; Ann Vanclooster; Nico Van De Weghe .163

ON THE WAY OF INTEGRATING EVACUATION APPROACHES
Ann Vanclooster; Phillipp De Maeyer; Veerle Fack ........................................................................................169

THE DIGITAL ROCK ENGINEERING SYSTEM BASED ON 3D GIS TECHNOLOGY
Defu Wu; Pei Peng; Yam Khoon Tor ..................................................................................................................173

Part 3

INTEGRATED 3D MODELING OF MULTI-UTILITY NETWORKS AND
THEIR INTERDEPENDENCIES FOR CRITICAL INFRASTRUCTURE ANALYSIS
Thomas Becker; Claus Nagel; Thomas H. Kolbe ...............................................................................................181

MODELING SPACE BY STEREOGRAPHIC REJECTION
Pim Bil .................................................................................................................................................................182

RAPID MODELLING OF COMPLEX BUILDING INTERIORS
Pawel Boguslawski; Christopher Gold ..............................................................................................................183

LARGE SCALE CONSTRAINT DELAUNAY TRIANGULATION FOR VIRTUAL
GLOBE RENDERING
Martin Christen; Stephan Nebiker .....................................................................................................................184

TOWARDS INTEROPERATING CITYGML AND IFC BUILDING MODELS:
A UNIFIED MODEL BASED APPROACH
Mohamed Sobih El-Mekawy; Anders Östman; Khurram Shahzad ..................................................................185
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL INVESTIGATION FOR MODELING INTERIOR UTILITIES WITHIN 3D GEO CONTEXT: TRANSFORMING IFC- INTERIOR UTILITY TO CITYGML/UTILITYNETWORKADE</td>
<td>186</td>
</tr>
<tr>
<td>Ihab Hijazi; Manfred Ehlers; Sisi Zlatanova; Thomas Becker; Léon van Berlo</td>
<td></td>
</tr>
<tr>
<td>DEPTH PERCEPTION IN VIRTUAL REALITY</td>
<td>187</td>
</tr>
<tr>
<td>Anja Matako; Jürgen Bollmann; Andreas Müller</td>
<td></td>
</tr>
<tr>
<td>INTERACTIVE URBAN AND FOREST FIRE SIMULATION WITH EXTINGUISHMENT SUPPORT</td>
<td>188</td>
</tr>
<tr>
<td>Aitor Moreno; Álvaro Segura; Anis Korchi; Jorge Posada; Oihana Otaegui</td>
<td></td>
</tr>
<tr>
<td>3D CADASTRE IN THE PROVINCE OF QUEBEC: A FIRST EXPERIMENT FOR THE CONSTRUCTION OF A VOLUMETRIC REPRESENTATION</td>
<td>189</td>
</tr>
<tr>
<td>Jacynthe Pouliot; Tania Roy; Guillaume Fouquet-Asselin; Joanie Desgroseilliers</td>
<td></td>
</tr>
<tr>
<td>3D MODELING FOR MOBILE AUGMENTED REALITY IN UNPREPARED ENVIRONMENT</td>
<td>190</td>
</tr>
<tr>
<td>Vincent Thomas; Sylvie Daniel; Jacynthe Pouliot</td>
<td></td>
</tr>
<tr>
<td>INTEGRATED REPRESENTATION OF (POSSIBLY UNBOUNDED) 2D AND 3D SPATIAL OBJECTS FOR RIGOROUSLY CORRECT QUERY AND MANIPULATION</td>
<td>191</td>
</tr>
<tr>
<td>Rodney James Thompson; Peter van Oosterom</td>
<td></td>
</tr>
<tr>
<td>INTERACTIVE RENDERING TECHNIQUES FOR HIGHLIGHTING IN 3D GEVIRTUAL ENVIRONMENTS</td>
<td>192</td>
</tr>
<tr>
<td>Matthias Trapp; Christian Beesk; Sebastian Pasewaldt; Jürgen Döllner</td>
<td></td>
</tr>
<tr>
<td>INTEGRATION OF BIM AND GIS: THE DEVELOPMENT OF THE CITYGML GEOBIM EXTENSION</td>
<td>193</td>
</tr>
<tr>
<td>Léon van Berlo; Ruben de Laat</td>
<td></td>
</tr>
<tr>
<td>MODELLING THREE-DIMENSIONAL GEOSCIENTIFIC DATASETS WITH THE DISCRETE VORONOI DIAGRAM</td>
<td>194</td>
</tr>
<tr>
<td>Tom van der Putte; Hugo Ledoux</td>
<td></td>
</tr>
<tr>
<td>CHALLENGES IN 3D GEO INFORMATION AND PARTICIPATORY DESIGN AND DECISION</td>
<td>195</td>
</tr>
<tr>
<td>Jan B.F. Van Erp; Anita H.M. Cremers; Judith M. Kessens</td>
<td></td>
</tr>
<tr>
<td>AN INTEGRATED FRAMEWORK FOR RECONSTRUCTING FULL 3D BUILDING MODELS</td>
<td>196</td>
</tr>
<tr>
<td>Langyue Wang; Gunho Sohn</td>
<td></td>
</tr>
<tr>
<td>TOWARDS SEMANTIC 3D CITY MODELING AND VISUAL EXPLORATIONS</td>
<td>197</td>
</tr>
<tr>
<td>Qing Zhu; Junqiao Zhao; Zhiqiang Du; Yeting Zhang; Weiping Xu; Xiao Xie; Yulin Ding; Fei Wang; Tingsong Wang</td>
<td></td>
</tr>
<tr>
<td>AUTHORS INDEX</td>
<td>199</td>
</tr>
</tbody>
</table>