Lecture Notes in Geoinformation and Cartography

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(Eds.)

Advances in 3D Geoinformation Systems

With 235 Figures

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Preface

Society is expecting and demanding more 3D support since users have experienced the added value in emerging visualisation applications such as 3D globe based interfaces, navigation systems presenting a 3D perspective, etc. Due to the rapid developments in sensor techniques more 3D data have become available. Effective algorithms for (semi) automatic object reconstruction are required. Integration of existing 2D objects with height data is a non-trivial process, and further research is needed. The resulting 3D models can be maintained in several forms: TEN (Tetrahedral Network), constructive solid geometry (CSG) models, regular polytopes, TIN boundary representation and 3D volume quad edge structure, layered/topology models, voxel based models, 3D models used in urban planning/polyhedrons, and n-dimensional models including time. 3D analysis and 3D simulation techniques explore and extend the possibilities of spatial applications. In such a dynamic scientific environment, it is very important to have high quality and an open exchange of ideas on these new developments. It is also very important to carefully review and document the progress that is made. This book and the associated 3D GeoInfo workshop are an attempt to achieve this goal. The workshop is the second in a series on 3D geo-information. The previous event took place in Kuala Lumpur, Malaysia, on 7-8 August 2006 (`http://www.fksg.utm.my/3dgeoinfo2006`). Selected papers from the first workshop were published in 'Innovations in 3D Geo Information Systems', Springer-Verlag, 2006. The current (2007) workshop was held in Delft, the Netherlands, while future discussions on 3D issues are expected to be held in Seoul, South Korea, on 12-14 November 2008. The chapters in this book are the result of the '2nd International Workshop on 3D Geo-Information: Requirements, Acquisition, Modelling, Analysis, Visualisation' (12-14 December 2007, Delft, the Netherlands). The workshop's website contains many details, including the programme of the event (`http://www.3d-geoinfo-07.nl`). The five themes – mentioned in the sub-title – give a good indication of the thematic scope and the chapters in this book, which have been organised accordingly. The chapters have been selected based on a full-paper submis-

sion and were thoroughly reviewed by three members of the international programme committee. The authors of the best and most original submissions were asked to submit revised versions based on these comments. Additionally, this book contains two chapters that are related to the invited key-notes, both with a Geo-ICT industry origin (TeleAtlas: 'Maps Get Real, Digital Maps evolving from mathematical line graphs to virtual reality models' and Oracle: 'On Valid and Invalid Three-Dimensional Geometries'). These chapters together make up the main part of the book. During the workshop there were also working group sessions organised according to each of the specific themes: Requirements & Applications, Acquisition, Modelling, Analysis, and Visualisation. All of the working group sessions followed a given format: current problems to be solved, potential solutions, and recommendations by the working group. The discussions started with a position paper that was usually prepared by the chairs of the working groups. These position papers are also included in the last part of this book. The discussion sessions were coordinated by the chair, and the concluding summaries of the results were presented at the closing plenary session.

This series of workshops is an excellent opportunity for the exchange of ideas on 3D requirements and the comparison of the different techniques of 3D acquisition, modeling and simulation. The 3D GeoInfo workshops aim to bring together international state-of-the-art research in the field of 3D geo-information. They offer an interdisciplinary forum to researchers in the closely related fields of 3D data collection, modelling, management, data analysis, and visualisation. We hope that this series will become a very interesting yearly event with many sparkling discussions on all aspects of handling 3D geo-information!

The editors of this book would like to thank the co-organisers (Eveline Vogels, Marc van Kreveld and George Vosselman) for the pleasant cooperation from the first initial idea to organise the workshop through the final preparations. Further, we are grateful to all of the authors for their original contributions (also to the authors of contributions that were not selected). Special thanks to the members of the programme committee; they had the difficult task of critically reviewing the contributions and providing constructive comments, thus enhancing the quality of the chapters included in this book. The editors are also grateful to the support provided by the Advanced Gaming and Simulation (AGS) research centre and the two projects RGI-011 '3D topography' and RGI-013 'Virtual reality for urban planning and security', funded by the Dutch Program 'Space for Geo-information'.

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