



**TUM** TECHNISCHE  
UNIVERSITÄT  
MÜNCHEN

# PIA07

Cooperating ISPRS  
Working Groups:

- WG I/2 : LIDAR and SAR systems
- WG III/2 : Surface Reconstruction
- WG III/4 : Automatic Image Interpretation  
for City-Modelling
- WG III/5 : Road Extraction and Traffic  
Monitoring
- WG IV/3 : Automated Geo-Spatial Data  
Acquisition and Mapping

## Photogrammetric Image Analysis

19-21 September 2007  
Munich, Germany  
[www.ipk.bv.tum.de/isprs/pia07](http://www.ipk.bv.tum.de/isprs/pia07)

## Final Program

Sponsored by:



# PIA07

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## Conference Chairs

Stilla, Uwe	Technische Universität München, Germany
Mayer, Helmut	Bundeswehr University Munich, Germany
Rottensteiner, Franz	University of Melbourne, Australia
Heipke, Christian	Leibniz Universität Hannover, Germany

## Cooperating ISPRS Working Groups

WG I/2	SAR and LIDAR Systems
WG III/2	Surface Reconstruction
WG III/4	Automatic Image Interpretation for City-Modelling
WG III/5	Road Extraction and Traffic Monitoring
WG IV/3	Automated Geo-Spatial Data Acquisition and Mapping

## Local Organizing Committee

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Eder, Konrad	Technische Universität München
Ellenbeck, Karl Heiko	University of Bonn
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Hoegner, Ludwig	Technische Universität München
Leitloff, Jens	Technische Universität München
Lenhart, Dominik	Technische Universität München
Stephani, Manfred	Technische Universität München

## Program Committee

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Harrie, Lars	Lund University, Sweden
Heipke, Christian	Leibniz Universität Hannover, Germany
Hellwich, Olaf	Technische Universität Berlin, Germany
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Jiang, Jie	National Geomatics Center of China, China
Jutzi, Boris	FGAN-FOM, Germany
Krzystek, Peter	Munich University of Applied Sciences, Germany
Mayer, Helmut	Bundeswehr University Munich, Germany
McGlone, Chris	SAIC, United States of America
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Mercer, Bryan	Intermap Technologies Corp., Canada
Meyer, Franz	Alaska Satellite Facility, United States of America
Neun, Moritz	University of Zürich, Switzerland
Pakzad, Kian	Leibniz Universität Hannover, Germany
Paparoditis, Nicolas	Institut Géographique National, France
Petzold, Ingo	University of Zürich, Switzerland
Purves, Ross	University of Zürich, Switzerland
Rottensteiner, Franz	University of Melbourne, Australia
Scharstein, Daniel	Middlebury College, United States of America
Schiewe, Jochen	University of Osnabrück, Germany
Sester, Monika	Leibniz Universität Hannover, Germany
Soergel, Uwe	Leibniz Universität Hannover, Germany
Stilla, Uwe	Technische Universität München, Germany
Toth, Charles	The Ohio State University, United States of America
Ulrich, Markus	MVTec Software GmbH, Germany
Winter, Stephan	University of Melbourne, Australia

Automated extraction of topographic objects from remotely sensed data is an important topic of research in Photogrammetry, Remote Sensing, GIS, and Computer Vision. This joint conference of ISPRS working groups I/2, III/2, III/4, III/5, and IV/3, held at Technische Universität München (TUM), discusses recent developments, the potential of various data sources, and future trends both with respect to sensors and processing techniques in automatic object extraction. The focus of the conference lies on methodological research.

The conference addresses researchers and practitioners from universities, research institutes, industry, government organizations, and private companies. The range of topics covered by the conference is reflected by the cooperating ISPRS working groups:

- SAR and LIDAR Systems (WG I/2)
- Surface Reconstruction (WG III/2)
- Automatic Image Interpretation for City-Modelling (WG III/4)
- Road Extraction and Traffic Monitoring (WG III/5)
- Automated Geo-Spatial Data Acquisition and Mapping (WG IV/3)

Prospective authors were invited to submit a full paper of maximum 6 pages and we received 49 papers for review. The presented papers have undergone a rigorous "double blind" review process of full papers, with a rejection rate of 30%. Each paper was reviewed at least by three members of the program committee. Accepted papers (34) and one invited paper are published as printed proceedings in the ISPRS series as well as on CD labelled as "Part A". Only a subset of these papers can be presented orally due to the single track design of PIA07 and the generous time slots for intensive discussion.

Authors who intended to present application oriented work that was in particular suitable for interactive presentation were invited to submit an extended abstract. A group of the program committee selected 32 out of 55 contributions for presentation. Accepted contributions based on abstract review were invited to submit full papers which are published on CD labelled as "Part B".

In total, we received contributions from authors coming from 26 countries. The proceedings include 66 papers from authors coming from 19 countries. There are 7 oral sessions with altogether 20 papers and two interactive sessions where 46 papers will be presented.

Finally, the Conference Chairs wish to thank all contributing authors, the members of the Program Committee and the members of the Local Organising Committee.

Munich, September 2007

U. Stilla, H. Mayer, F. Rottensteiner, C. Heipke  
(Conference Chairs)

# Program Overview

## Sep-19 (Wednesday)

10:30	<b>Opening</b>	
11:00		
11:30	<b>Building Facades</b>	
12:00		
12:30	<b>Lunch</b>	
13:00		
13:30	<b>Processing of LIDAR Points</b>	
14:00		
14:30		
15:00		
15:00	<b>Coffee Break</b>	
15:30	<b>Interactive Session</b>	
16:00		
16:30		
17:00		
17:30		
18:00		
18:30		<b>Ice Breaker at TUM</b>

## Sep-20 (Thursday)

9:00	<b>Vegetation and Land Cover</b>
9:30	
10:00	
10:30	<b>Coffee Break</b>
11:00	<b>Roads and Traffic</b>
11:30	
12:00	
12:30	
12:30	<b>Lunch</b>
13:00	
13:30	<b>Interactive Session</b>
14:00	
14:30	
15:00	
15:30	
15:30	<b>Coffee Break</b>
16:00	<b>Data Abstraction</b>
16:30	
17:00	
17:30	
18:00	
19:00	<b>Social Event (Town Hall)</b>

## Sep-21 (Friday)

9:00	<b>Key Note</b>
9:30	<b>Stereo</b>
10:00	
10:30	<b>Coffee Break</b>
11:00	<b>Building Detection and Characterization</b>
11:30	
12:00	
12:30	<b>Closing</b>

## Opening

- 10:30 **Welcome**  
Stilla U (Technische Universität München, Germany)  
Vogt N (Technische Universität München, Germany)  
Altan O (Istanbul Technical University, Turkey )
- 11:00 **Keynote: TerraSAR-X - First Results in High Resolution Radar Mapping of the Earth**  
Bamler R (German Aerospace Center – DLR, Germany)

## Building Facades

Chair: Mayer H (Bundeswehr University Munich, Germany)

- 11:30 **Data driven rule proposal for grammar based facade reconstruction**  
Ripperda N, Brenner C (Leibniz Universität Hannover, Germany)
- 12:00 **Refinement of building facades by integrated processing of LIDAR and image data**  
Becker S, Haala N (University of Stuttgart, Germany)

12:30 **Lunch**

## Processing of LIDAR Points

Chair: Toth C (The Ohio State University, United States of America)

- 13:30 **Automatic registration of laser point clouds of urban areas**  
Hebel M (FGAN-FOM, Germany), Stilla U (Technische Universität München, Germany)
- 14:00 **Digital terrain model on vegetated areas: Joint use of airborne LIDAR data and optical images**  
Bretar F (Institut Géographique National, France),  
Chehata N (Université Bordeaux, France)
- 14:30 **Detection of weak laser pulses by full waveform stacking**  
Stilla U, Yao W (Technische Universität München, Germany), Jutzi B (FGAN-FOM, Germany)
- 15:00 **Coffee Break**



## Interactive Session

- 15:30 **Exploiting spatial patterns for informal settlement detection in arid environments using optical spaceborne data**  
Stasolla M, Gamba P (Università di Pavia, Italy)
- Continuous self-calibration and ego-motion determination of a moving camera by observing a plane**  
Meidow J, Kirchhof M (FGAN-FOM, Germany)
- Scale behaviour prediction of image analysis models for 2d landscape objects**  
Heuwold J, Pakzad K, Heipke C (Leibniz Universität Hannover, Germany)
- Road extraction in suburban areas based on normalized cuts**  
Grote A, Butenuth M, Heipke C (Leibniz Universität Hannover, Germany)
- Segmentation of tree regions using data of full-waveform laser**  
Gross H, Jutzi B, Thoennessen U (FGAN-FOM, Germany)
- Interactive image-based urban modelling**  
Vezhnevets V, Konushin A, Ignatenko A (Moscow State University, Russian Federation)
- 3d least-squares-based surface reconstruction**  
Ton D, Mayer H (Bundeswehr University Munich, Germany)
- Information mining for disaster management**  
Lucas C, Werder S, Bähr HP (Universität Karlsruhe, Germany)
- Automatic discrimination of farmland types using IKONOS imagery**  
Helmholz P, Heipke C (Leibniz Universität Hannover, Germany), Gerke M (International Institute for Geo-Information Science and Earth Observation – ITC, Netherlands)
- Model-driven and data-driven approaches using LIDAR data: Analysis and comparison**  
Tarsha-Kurdi F, Landes T, Grussenmeyer P, Koehl M (INSA de Strasbourg, France)
- Automatic detection of zenith direction in 3d point clouds of built-up areas**  
Hansen W von (FGAN-FOM, Germany)

**15:30 Adapting, splitting and merging cadastral boundaries according to homogenous LULC types derived from SPOT 5 data**

Tiede D, Lang S, Hoelbling D (University Salzburg, Austria), Moeller MS (Austrian Academy of Sciences, GIScience, Austria)

**Detection of pose changes for spatial objects from projective images**

Selby BP, Walter S (MedCom, Germany), Sakas G (Fraunhofer IGD, Germany), Groch W-D (University of Applied Sciences Darmstadt, Germany), Stilla U (Technische Universität München, Germany)

**Semantically enhanced prototypes for building reconstruction**

Dörschlag D, Gröger G, Plümer L (University of Bonn, Germany)

**Methods for automatic extraction of regularity patterns and its application to object-oriented image classification**

Ruiz LA, Recio JA, Hermosilla T (Polytechnic University of Valencia, Spain)

**18:30 Ice Breaker at TUM**

## Vegetation and Land Cover

Chair: Heipke C (Leibniz Universität Hannover, Germany)

- 9:00 **Extraction of landcover themes out of aerial orthoimages in mountainous areas using external information**  
Le Bris A, Boldo D (Institut Géographique National, France)
- 9:30 **Assessing the 3d structure of the single crowns in mixed alpine forests**  
Barilotti A, Sepic F, Abramo E, Crosilla F (University of Udine, Italy)
- 10:00 **A supervised approach for object extraction from terrestrial laser point clouds demonstrated on trees**  
Barnea S, Filin S (Technion-Israel Institute of Technology, Israel), Alchanatis V (The Volcani Center, Israel)
- 10:30 **Coffee Break**

## Roads and traffic

Chair: Stilla U (Technische Universität München, Germany)

- 11:00 **Automatic road extraction from remote sensing imagery incorporating prior information and colour segmentation**  
Ziems M, Heipke C (Leibniz Universität Hannover), Gerke M (International Institute for Geo-Information Science and Earth Observation – ITC, Netherlands)
- 11:30 **Rectangular road marking detection with marked point processes**  
Tournaire O (UMLV / OTIG, Institut Géographique National, France), Paparoditis N, Lafarge F (Institut Géographique National, France)
- 12:00 **Spatio-temporal matching of moving objects in optical and SAR data**  
Hinz S, Weihing D (Technische Universität München, Germany), Kurz F, Suchandt S (German Aerospace Center – DLR, Germany)
- 12:30 **Lunch**

## Interactive Session

13:30 **Buildings modelling for digital orthorectification of urban areas images**

Marinov BD (UACEG, Bulgaria)

**Building change detection from digital surface models and multi-spectral images**

Rottensteiner F (University of Melbourne, Australia)

**An integrated approach to level-of-detail building extraction and modelling using airborne LiDAR and optical imagery**

Chikomo FO, Mills JP, Barr SL (University of Newcastle upon Tyne, United Kingdom)

**Automated generation of building textures from infrared image sequences**

Hoegner L, Stilla U (Technische Universität München, Germany)

**Moving targets velocity and direction estimation by using a single optical VHR satellite imagery**

Pesaresi M, Pagot E (European Commission, Joint Research Centre, Italy) , Gutjahr KH (Joanneum Research Forschungsgesellschaft mbH, Austria)

**Novel platform for terrestrial 3d mapping from fast vehicles**

Blug A, Baulig C, Dambacher M, Wölfelschneider H, Höfler H (Fraunhofer Institute for Physical Measurement Techniques IPM, Germany)

**Automatic traffic monitoring with an airborne wide-angle digital camera system for estimation of travel times**

Kurz F, Charmette B, Suri S, Rosenbaum D, Stätter R, Reinartz P (German Aerospace Center – DLR, Germany), Spangler M, Leonhardt A (Technische Universität München, Germany), Bachleitner M (General German Automobile Association – ADAC, Germany)

**Road junction extraction from high resolution aerial images**

Ravanbakhsh M, Heipke C, Pakzad K (Leibniz Universität Hannover, Germany)

**Inferring traffic activity from optical satellite images**

Leitloff J, Stefan Hinz H (Technische Universität München, Germany)

13:30

**TerraSAR-X value added image products**

Weber M, Schmidt N (Infoterra GmbH, Germany), Raggam J, Gutjahr KH, Wimmer A (Joanneum Research Forschungsgesellschaft mbH, Austria)

**A semi-automatic high resolution SAR data interpretation procedure**

DellAcqua F, Gamba P, Lisini G, Stasolla M (Università di Pavia, Italy)

**Registration of near real-time SAR images by image-to-image matching**

Wessel B, Huber M, Roth A (German Aerospace Center – DLR, Germany)

**National and regional scale DEMs created from airborne InSAR**

Mercer B (Intermap Technologies Corp., Canada)

**Multibaseline interferometric SAR at millimeterwaves - Test of an algorithm on real data and a synthetic scene**

Essen H, Brehm T (FGAN-Research Institute for High Frequency Physics and Radar Techniques, Germany), Boehmsdorff S (Technical Center of the German Armed Forces, Germany), Stilla U (Technische Universität München, Germany)

**Automatic class mean calculation of road surface from IKONOS images using fuzzy logic and particle swarm optimization**

Mohammadzadeh A, Valadan Zoej MJ (K.N.Toosi University of Technology, Iran), Tavakoli A (Amirkabir University of Technology, Iran)

**Extracting orthogonal building objects in urban areas from high resolution stereo satellite image pairs**

Krauß T, Reinartz P (German Aerospace Center – DLR, Germany), Stilla U (Technische Universität München, Germany)

**Automatic velocity estimation of targets in dynamic stereo**

Scherer N, Kirchhof M, Schäfer R (FGAN-FOM, Germany)

**Improvement of interior and exterior orientation of the three line camera HRSC with a simultaneous adjustment**

Spiegel M (Technische Universität München, Germany)

**Digital elevation modelling by UltraCam images**

Gruber M, Schneider S (Microsoft Photogrammetry, Austria)

13:30 **Object extraction at airport sites using DTMs/DSMs and multispectral image analysis**  
Demir N, Baltsavias E (ETH Zurich - Swiss Federal Institute of Technology, Switzerland)

**Using pavement markings to support the QA/QC of LiDAR data**

Toth C, Paska E, Brzezinska D (The Ohio State University, United States of America)

**Single tree detection in forest areas with high-density LiDAR data**

Reitberger J, Krzystek P (Munich University of Applied Sciences, Germany), Heurich M (Dept. of Research, Bavarian Forest National Park, Germany) , Stilla U (Technische Universität München, Germany)

**Point positioning accuracy of airborne LiDAR systems: A rigorous analysis**

May NC, Toth C (The Ohio State University, United States of America)

**Multi-view stereo and LiDAR for outdoor scene modelling**

Strecha C (ESAT/PSI KU Leuven, Belgium), von Hansen W, Thoennessen U (FGAN-FOM, Germany) , Van Gool L (ESAT/PSI KU Leuven, Belgium, ETH Zurich, Switzerland)

**Automatic non parametric procedures for terrestrial laser point clouds processing**

Beinat, A Crosilla F, Visintini D, Sepic F (University of Udine, Italy)

**Object extraction at airport sites using DTMs/DSMs and multispectral image analysis**

Demir N, Baltsavias E (ETH Zurich - Swiss Federal Institute of Technology, Switzerland)

**A 'sight-speed' human-computer interaction for augmented geospatial data acquisition and processing systems**

Gennady G (The University of the South Pacific, Fiji Islands), Levin E (Michigan Technological University, United States of America)

**A multi-level image description model scheme based on digital topology**

Zhu GB, Liu XL, Li QQ (Wuhan University, China), Jia ZG (China Seismological Bureau, China)

**An approach for semi-automatic extraction of features from aerial photographs**

Eker O, Kiraci AC (Harita Genel Komutanlığı, Turkey), Seker DZ (İstanbul Teknik Üniversitesi, Turkey)

**13:30 Close range photogrammetry used for the monitoring of harbour breakwaters**  
Hennau M, deWulf A, Goossens R, deRouck J, vanDamme D (Ghent University, Belgium), Hanssens P (VLG-LIN-AWZ-Waterwegen Kust, Belgium), vanDamme L (VO-MOW-Maritieme Toegang - Cel Kusthavens, Belgium)

**Identification of urban features using object-oriented image analysis**

Mavrantza OD (Ktimatologio S.A. - Hellenic Cadastral Agency, Greece), Argialas DP (National Technical University of Athens, Greece)

**Automatic reconstruction of shape evolution of ETFE-foils by close-range photogrammetric image analysis**

Hinz S, Rist F, Schiemann L, Stephani M (Technische Universität München, Germany)

**15:30 Coffee Break**

**Data Abstraction**

Chair: Sester M (Leibnitz Universität Hannover, Germany)

**16:00 A formal model and mixed-integer program for area aggregation in map generalization**  
Hauert JH (Leibniz Universität Hannover, Germany)

**16:25 Representation and analysis of topology in multi-representation databases**  
Breunig M, Thomsen A, Broscheit B, Butwilowski E, Sander U (IGF-Universität Osnabrueck, Germany)

**16:50 Implicit shape models, model selection, and plane sweeping for 3d facade interpretation**  
Reznik S, Mayer H (Bundeswehr University Munich, Germany)

**17:15 Towards semantic interaction in high-detail realtime terrain and city visualization**  
Wahl R, Klein R (University of Bonn, Germany)

**19:00 Social Event (Town Hall)**

**9:00 Keynote: Towards mass-produced building models**

van Gool L (ETH Zurich - Swiss Federal Institute of Technology, Switzerland)

**Stereo**

Chair: Förstner W (University of Bonn, Germany)

**9:30 Efficient semi-global matching for trinocular stereo**

Heinrichs M, Rodehorst V, Hellwich O (Berlin University of Technology, Germany)

**10:00 Robust disparity maps with uncertainties for 3d surface reconstruction or ground motion interference**

Jalobeanu A, Fitzenz D (LSIIT (CNRS - Univ. Strasbourg), France)

**10:30 Coffee Break**

**Building Detection and Characterization**

Chair: Rottensteiner F (University of Melbourne, Australia)

**11:00 3d segmentation of unstructured point clouds for building modelling**

Dorninger P, Nothegger C (Vienna University of Technology, Austria)

**11:30 2d building change detection from high resolution aerial images and correlation digital surface models**

Champion N (Institut Géographique National, France)

**12:00 InSAR phase profiles at building locations**

A. Thiele, E. Cadario, K. Schulz, U. Thoennessen (FGAN-FOM, Germany), U. Soergel (Leibniz Universität Hannover, Germany)

**12:30 Closing  
Farewell Beer**



## Comments