The 5th International Symposium on Mobile Mapping Technology

MMT'07

Padua, Italy
28 - 31 May 2007

PROGRAMME
Contents

WELCOME REMARKS ........................................ PG. 02

COMMITTEES .................................................. PG 04

MOBILE MAPPING SUMMER TUTORIAL .................. PG 04

TIME TABLE .................................................. PG 05

PROGRAM ..................................................... PG 09

Tuesday, 29............................................... pg 09
Wednesday, 30.......................................... pg 13
Thursday, 31............................................. pg 20

SPONSORS .................................................... PG 25

MAP OF LOCATION ........................................ PG 26

GENERAL INFORMATION .................................. PG 27
Welcome to MMT'07

The International Symposium on Mobile Mapping Technology (MMT) is the premier event being organized jointly by the ISPRS, FIG, and IAG. MMT offers a great forum for research and development in mobile mapping technology systems and applications. The advancement of Mobile Mapping technology has attributed to many aspects in Geomatics. This symposium will reflect the core spectrum of the latest developments in mobile mapping technology, ranging from the algorithm research to the system development, from land-based to airborne systems, from direct georeferencing to sensor integration, from mobile data collection do dynamic GIS management.

The MMT'07 will take place in Padua, Italy. Padua has always been considered a university-city as it hosts the second oldest University in Europe (1222). It is world famous for its schools of Medicine (anatomy), Law, Mathematics and Physics. Nicolaus Copernicus was among the scholars of the University, and Galileo Galilei taught here from 1592 to 1610. the city has always been a hub in collaboration with other universities around the world and a center of excellence for many projects. Historically the city is very interesting as a lot of areas are of historical interest and make tourists spend a lot of pleasurable hours visiting and strolling around the town.

We expect a wonderful event and are looking forward to seeing you in Padua.

Convenors:
Dr. Antonio Vettore, University of Padua – antonio.vettore@unipd.it
Dr. Naser El-Sheimy, University of Calgary – elsheimy@ucalgary.ca
Committees

Local organizers:
CIRGEO - Interdepartment Research Center for Geomatics – University of Padua

Convenors:
Dr. Antonio Vettore, University of Padua - antonio.vettore@unipd.it
Dr. Naser El-Sheimy, University of Calgary - elsheimy@ucalgary.ca

Organizing Committee:

Publication Chair: Alberto Guarnieri (CIRGEO – University of Padua)
Exhibit Chair: Francesco Pirotti (CIRGEO – University of Padua)
Finals and registration Chair: Serena Galzignato, Caterina Sigolo (University of Padua)

Scientific Committee:

Chair: Naser El-Sheimy (University of Calgary, Canada)
Co-Chairs: Ron Li (USA), Dorotha Brzezinska (USA), Vincent Tao (Canada), Charles Toth (USA), Marinos Kavouras (Greece)

Members:
Chris Rizos (Australia)  Maurizio Barbarella (Italy)
Rudolf Staiger (Germany)  Matt Higgins (Australia)
Alain Baudoin (France)  Mike Chapman (Canada)
Jan Skaloud (Switzerland)  Nickolas Paparoditis (France)
Armin Gruen (Switzerland)  Petro Patias (Greece)
Ayman Habib (Canada)  Robert Haala (Germany)
Clive Fraser (Australia)  Ruggero Frezza (Italy)
Costas Armenakis (Canada)  Ryosuke Shibasaki (Japan)
Deren Li (China)  Thomas Wuenderlich (Austria)
Fabio Crosilla (Italy)  Yang Gao (China)
Giorgio Manzoni (Italy)  Ferdinando Sansò (Italy)
Hans-Gerd Maas (Germany)  Jinling Wang (Australia)
Heribert Kahmen (Austria)  Ismael Colomina (Spain)
Mohamed Mostafa (Canada)  Krzysztof Gajdamowicz (Sweden)
Jonathan Li, (Canada)
# Tutorial TimeTable

**Monday 28\textsuperscript{th} May – Mobile Mapping Systems Tutorial**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:25</td>
<td>Welcome Speech</td>
<td>Director of CIRGEO</td>
</tr>
<tr>
<td>08:30</td>
<td><strong>T1 - 1\textsuperscript{st} part</strong> Overview of Digital Mobile Mapping Systems</td>
<td>Dr. Naser El-Sheimy - the University of Calgary Canada</td>
</tr>
<tr>
<td>10:00</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td><strong>T1 - 2\textsuperscript{nd} part</strong> Overview of Digital Mobile Mapping Systems</td>
<td>Dr. Naser El-Sheimy - the University of Calgary Canada</td>
</tr>
<tr>
<td>11:30</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>13:00</td>
<td><strong>T2 - an Overview of Airborne Digital Mapping Systems and Quality Control of Large Mapping Projects</strong></td>
<td>Dr. Mohamed M.R. Mostafa, Applanix Corp, Canada</td>
</tr>
<tr>
<td>15:00</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>15:30</td>
<td><strong>T3 - Airborne Laser Altimetry: DEM Production and Automatic Feature Extraction</strong></td>
<td>Dr. Charles Toth and Drs. Dorota Grejner-Brzezinska, Ohio State University</td>
</tr>
<tr>
<td>17:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>07:30</td>
<td>Registration</td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>Opening Ceremony</td>
<td>Aula Magna</td>
</tr>
<tr>
<td></td>
<td>Welcome Speech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Chair of MMT2007 – Dr. Naser El-Sheimy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prof. Vincenzo Milanesi - Rector of the University of Padua</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prof. Raffaele Cavalli Dean Faculty of Agriculture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dr. Orhan Altan (ISPRS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dr. Rudolf Staiger (FIG)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dr. Chris Rizos (IAG)</td>
<td></td>
</tr>
<tr>
<td>09:30</td>
<td>Keynote Speeches</td>
<td>Aula Magna</td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Magna)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Mobile Mapping with UAV Technology - Prof. Armin Gruen - ETH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- GNSS and Digital Maps, Symbiosis or Both Sides of the Same Medal? -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mr. Lionel Garin, NemeriX</td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td>Keynote Speech</td>
<td>Aula Magna</td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Magna)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Terrestrial Mapping for a Mobile World - Mr. Eric DesRoche</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermap Technologies</td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>13:30</td>
<td>Oral session</td>
<td>Aula Magna</td>
</tr>
<tr>
<td></td>
<td>- Automatic Feature Extraction from MMT Images</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Magna)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral session</td>
<td>Aula Nievo</td>
</tr>
<tr>
<td></td>
<td>- LiDAR and SAR mapping systems</td>
<td></td>
</tr>
<tr>
<td>15:00</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>15:15</td>
<td>Oral session</td>
<td>Aula Magna</td>
</tr>
<tr>
<td></td>
<td>- Mobile Mapping applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Magna)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral session</td>
<td>Aula Nievo</td>
</tr>
<tr>
<td></td>
<td>- Estimation and optimization algorithms</td>
<td></td>
</tr>
<tr>
<td>17:30</td>
<td>WELCOME PARTY</td>
<td>Basilica</td>
</tr>
<tr>
<td></td>
<td>(Location - Basilica)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Location - Aula Nievo</td>
<td>Location - Archivio Antico</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>09:00</td>
<td>Oral session - Direct Georeferencing</td>
<td>Oral session - GNSS</td>
</tr>
<tr>
<td></td>
<td>- Mobile Mapping applications</td>
<td>- Automated and semi-automated image segmentation</td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Nievo)</td>
<td>and object Extraction/recognition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Location - Archivio Antico)</td>
</tr>
<tr>
<td>10:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10:45</td>
<td>Oral session - GNSS</td>
<td>Oral session - Image sequence processing</td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Nievo)</td>
<td>(Location - Archivio Antico)</td>
</tr>
<tr>
<td>12:45</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td>Oral session - Mobile Mapping applications</td>
<td>Oral session - LiDAR and SAR mapping systems</td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Nievo)</td>
<td>(Location - Archivio Antico)</td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>16:15</td>
<td>Keynote Speech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Nievo)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunities and Challenges in Mobile Mapping for On-line</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Services and Consumer Applications: A Perspective from</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microsoft Virtual Earth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Prof. Vincent Tao, Microsoft Virtual Earth)</td>
<td></td>
</tr>
<tr>
<td>17:15</td>
<td>Poster Session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Location - Aula Nievo)</td>
<td></td>
</tr>
<tr>
<td>20:00</td>
<td>GALA DINNER</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Location - Aula Nievo</td>
<td>Location - Archivio Antico</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>09:00</td>
<td>Oral session - <em>Mobile Mapping Technology - components, platforms, etc.</em></td>
<td>Oral session - <em>Estimation and optimization algorithms</em> (Location - Archivio Antico)</td>
</tr>
<tr>
<td>10:30</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10:45</td>
<td>Oral session - <em>Mobile Mapping Technology - components, platforms, etc.</em></td>
<td>Oral session - <em>Wireless positioning techniques</em> (Location - Archivio Antico)</td>
</tr>
<tr>
<td></td>
<td>- Automated and semi-automated image segmentation and object Extraction/recognition</td>
<td></td>
</tr>
<tr>
<td>12:45</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td>Oral session - <em>3D Mobile Mapping and GIS integration</em></td>
<td>Oral session - <em>Estimation and optimization algorithms</em> (Location - Archivio Antico)</td>
</tr>
<tr>
<td>15:30</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>15:45</td>
<td>Oral session - <em>3D Mobile Mapping and GIS integration</em></td>
<td>Oral session - <em>Sensor calibration - orientation, integration, reliability</em> (Location - Archivio Antico)</td>
</tr>
<tr>
<td>17:45</td>
<td>(Location - Aula Nievo)</td>
<td></td>
</tr>
<tr>
<td>18:00</td>
<td><strong>CLOSING CEREMONY</strong></td>
<td></td>
</tr>
</tbody>
</table>
Introduction

Mobile Mapping Systems (MMS), the methodology that integrates digital mapping sensors with direct geo-referencing, has developed rapidly over the past fifteen years. What used to be a topic of academic study has become a commercially viable industry. The tutorial aims at familiarizing young scientists and potential users with mobile mapping technologies in an intensive course by a group of internationally highly recognized researchers and experts, industry developers, and users.

The program is designed to present the key elements of mobile mapping, starting from its theoretical background, through navigation and imaging sensors mounted on a moving platform, via data handling by geographical information systems, to automated feature extraction. The material introduced in the tutorial will be emphasized by real-life examples of DMM Systems in land, air, marine, and underground systems.

Intended Audience: The tutorial is aimed at students, practitioners, engineers, and managers who are new to the field of mobile mapping. The material will be presented in such a way that requires minimal technical background.

Topics and Authors:

Overview of Digital Mobile Mapping Systems  
Dr. Naser El-Sheimy - the University of Calgary Canada

Overview of Airborne Digital Mapping Systems and Quality Control of Large Mapping Projects  
Dr. Mohamed M.R. Mostafa, Applanix Corp, Canada

Airborne Laser Altimetry: DEM Production and Automatic Feature Extraction  
Dr. Charles Toth and Drs. Dorota Grejner-Brzezinska, Ohio State University

Location and Fees

The Mobile Mapping Summer School will be held in Archivio Antico Room at Palazzo Bo (conference location). The fee for the summer school is only 100 euro and is not included with conference fee. Please sign up as soon as possible as there is a limited number of participants.
Conference Program

Tuesday May 29

7:30 – 9:00
Participant Registration
Location - Registration Desk

9:00 – 9:30
Opening Ceremony
Location - Aula Magna
- Chair of MMT2007 – Dr. Naser El-Sheimy
- Prof. Vincenzo Milanesi - Rector of the University of Padua
- Prof. Raffaele Cavalli – Dean of the Faculty of Agriculture
- Dr. Orhan Altan (ISPRS)
- Dr. Rudolf Staiger (FIG)
- Dr. Chris Rizos (IAG)

9:30 – 11:00
Keynote Speeches
Location - Aula Magna

Mobile Mapping with UAV Technology
Prof. Armin Gruen – ETH Zurich

GNSS and Digital Maps, Symbiosis or Both Sides of the Same Medal?
Mr. Lionel Garin – CTO, NemeriX

11:00 – 11:15
Coffee Break

11:15 – 12:00
Keynote Speeches
Location - Aula Magna

Terrestrial Mapping for a Mobile World
Mr. Eric DesRoche – Intermap Technologies Corporation

12:00 – 13:30
Lunch Break
13:30 – 15:00
Parallel Oral Session A
Location - Aula Magna

Automatic Feature Extraction from MMT Images
(Chair: Dr. Ayman Habib)

ARVEE, Automatic Road Geometry Extraction System for Mobile Mapping
Wang Cheng, Taher Hassan, Naser El-Sheimy

Automatic 3D Extracting Roadmark Objects with Centimetric Accuracy From Stereopairs of a Ground-based Mobile Mapping System
Bahman Soheilian, Nicolas Paparoditis, Didier Boldo, Jean-Paul Rudant

Strategies for Texturing Building Models with Low Resolution Infrared Image Sequences
Hoegner Ludwig, Kumke Holger, Stilla Uwe, Meng Liqiu

Automatic Detection of Range Variance of Facades From Vehicle-based Image Sequence
Kang Zhizhong, Zlatanova Sisi, Gorte Ben

13:30 – 15:00
Parallel Oral Session B
Location – Aula Nievo

LiDAR and SAR Mapping Systems
(Chair: Dr. Charles Toth)

LiDAR System Self-calibration Using Planar Patches From Photogrammetric Data
A. Habib, K. Bang, S. Shin, Edson Mitishita

Integrated GPS-aided Inertial LiDAR and Optical Imaging Systems for Aerial Mapping
Sanchez Richard D., Mullins Jerry L.

Accuracy Estimation for Laser Point Cloud Including Scanning Geometry
Schaer Philipp, Skaloud Jan, Landtwing Stephan, Legat Klaus

Building Edge Extraction From LiDAR Based on Jump Detection in Non-Parameter Regression Model
Li Yu, Li Jonathan, Chapman Michael
**15:00 – 15:15**

Coffee Break

**15:15 – 17:15**

**Parallel Oral Session A**

Location - Aula Magna

Estimation and Optimization Algorithms
*(Chair: Dr. Aboelmagd Noureldin)*

Intelligent Tuning of a Kalman Filter Using Low-cost MEMS Inertial Sensors
*Goodall Chris, El-Sheimy Naser*

Improving the Attitude Accuracy of a Low Cost Mems/gps Integrated System Using GPS Heading Sensor
*Huang Yun-Wen, Li Chia-Yuan, Chang Hsiu-Wen, Wu Hsiao-Wen, Hu Han-Wei, Chiang Kai-Wei*

Intelligent Pedestrian Positioning in Vienna: Knowledge-based Kalman Filtering
*Thienelt Michael, Eichhorn Andreas, Reiterer Alexander*

**15:15 – 17:15**

**Parallel Oral Session B**

Location – Aula Nievo

Mobile Mapping Applications
*(Chair: Dr. Michael Chapman)*

Tibet Railway Surveying Using MMT
*Hu Qingwu, Chen Zhiyong, Guo Sheng*

Geo-registration of Video Sequences Captured From Micro and Mini Uavs – Approaches and Accuracy Assessment
*Eugster Hannes, Nebiker Stephan*

An Integrated Mobile Mapping System for Data Acquisition and Automated Asset Extraction
*Kingston Tara, Gikas Vassilis, Laflamme Claude*

Photogrammetric Bridging Using Filtered Monocular Optical Flow
*Silva João Fernando, Barbosa Ricardo, Meneguette Jr. Messias, Gallis Rodrigo*
Welcome Party

The welcome party will be held in the conference location at the Basilica (see map on page 26).
**Wednesday May 30**

**9:00 – 10:30**  
**Parallel Oral Session A**  
**Location - Aula Nievo**

**Direct Georeferencing / Mobile Mapping Applications**  
(Chair: Dr. Mohamed Mostafa)

*RapidOrthoTM – A New Tool for Rapid Orthophoto Production for Emergency Response*  
*Mohamed M.R. Mostafa*

*Topographic Mapping Capability Analysis of Mars Exploration Rover Imagery*  
*Di Kaichang, Li Ron*

*Moving Toward Real-time Mobile Mapping: Autonomous Vehicle Navigation*  
*Toth Charles, Ozguner Umit, Brzezinska Dorota*

*Influence of Tie Point Distribution on Integrated Sensor Orientation*  
*Khoshelham Kourosh, Saadatseresht Mohammad, BG Gorte*

**9:00 – 10:30**  
**Parallel Oral Session B**  
**Location - Archivio Antico**

**Precise Point Positioning for Mobile Mapping**  
*El-Mowafy Ahmed*

**Semantic Indexing for Visual Recognition of Buildings**  
*Haider Ali, Paar Gerhard, Paletta Lucas*

**Visual Object Recognition in the Context of Mobile Vision Services**  
*Paletta Lucas*
**10:30 – 10:45**

Coffee Break

**10:45 – 12:45**

Parallel Oral Session A

*Location - Aula Nievo*

**GNSS**  
*(Chair: Dr. Chris Rizos)*

- Position and Orientation Data Requirements For Autonomous Vehicle Navigation  
  *Louis Nastro*

- Performance Evaluation of Sparse Networks of Continuously Operating Reference Station Networks for Mobile Mapping Applications  
  *Gordini Cristian*

- Comparison of the Performance of Medium and Low Level GNSS Apparatus, with and Without Reference Networks  
  *Brovelli Maria Antonia, Realini Eugenio, Visconti Maria Grazia*

- Mobile Mapping Applications Based on the Cyprus Permanent GPS Network  
  *S. Stylianidis, S. Spatalas, C. Pikridas, P. Patias*

- GNSS Network Real Time Positioning: Testing Procedure to Evaluate the Accuracy of a Geodetic GNSS Moving Antenna  
  *Gordini Cristian, Abbondanza Claudio, Barbarella Maurizio*

**10:45 – 12:45**

Parallel Oral Session B

*Location - Archivio Antico*

**Image Sequence Processing**  
*(Chair: Visintini Domenico)*

- Velocity Estimation of a Mobile Mapping Vehicle Using Filtered Monocular Optical Flow  
  *Barbosa Ricardo, Silva João Fernando, Meneguette Jr. Messias; Gallis Rodrigo*

- Road Survey by Kalman Filter Rectification of Image Sequences Acquired with a Monoscopic Low-cost MMS  
  *Visintini Domenico*
Comprehensive Analysis of True Orthophoto Generation Techniques in a Multi-sensor Environment  
Ayman Habib, Ki-In Bang, Changjae Kim, Sungwoong Shin, and Dong-Cheon Lee

The Simplicity and Complexity of Straights and Curves  
Leahy Frank Judd Mark Fraser Clive

Modeling Changes in Cloud Structure Using Motion Imagery  
Theiss Henry, Johanesen Todd

Accuracy Assessment of ADS40 Imagery as a Function of Flying Height and Aerial Triangulation Strategies  
Casella Vittorio, Franzini Marica, Padova Barbara

12:45 – 14:00  
Lunch Break

14:00 – 16:00  
Parallel Oral Session A  
Location - Aula Nievo

Mobile Mapping Applications  
(Chair: Dr. Deren Li)

Application of L-MMS in Railroad Clearance Detection  
Zhiyong Chen, Qingwu Hu, Jianfeng Yuan

A-tracker: an Animal Tracking Solution  
Hunter Andrew, El-Sheimy Naser, Wright, D. Bruce; Stenhouse, G.

Digital Measurable Image Based Geo-Spatial Information Service  
Li Deren, Hu Qingwu, Guosheng Chen Zhiyong

Quality Management in Kinematic Laser Scanning Applications  
Graefe Gunnar

Hypothesis Generation of Instances of Road Signs in Color Imagery Captured by Mobile Mapping Systems  
Habib Ayman, Jha Maya, Chang Yu-chuan

Measurement of Road Roughness by Low-Cost Photogrammetric System  
Imre Kertesz, Tamas Lovas, Arpad Barsi
14:00 – 16:00
Parallel Oral Session B
Location - Archivio Antico

LiDAR and SAR Mapping Systems
(Chair: Dr. Jan Skaloud)

Global Registration of Non Static 3D LiDAR Point Clouds: SVD Factorization and Robust GPA Methods
Crosilla Fabio, Beinat Alberto

Integration of LiDAR and Stereoscopic Imagery for Automated Route Corridor Inventory
McCarthy Timothy, Charlton Martin, Fortheringham Asf, O’malley Vincent

Integration of a Terrestrial LiDAR and a Mobile Mapping Platform
Grussenmeyer Pierre, Smigiel Eddie, Alshawa Majd

A New Approach for Assessing LiDAR Data Accuracy for Corridor Mapping Applications
R. Valerie Ussyshkin and Brent Smith

Analysis of the Headwater Basins' Morphology by High-Resolution LiDAR -derived DTM
Tarolli Paolo, Dalla Fontana Giancarlo

16:00 – 16:15
Coffee Break

16:15 – 17:00
Keynote Speech
Location - Aula Nievo

Opportunities and Challenges in Mobile Mapping for On-line Services and Consumer Applications: A Perspective from Microsoft Virtual Earth
Dr. Vincent Tao, Microsoft Virtual Earth
Director of Microsoft Virtual Earth, responsible for the technology and business development of Microsoft Virtual Earth program
17:15 – 19:15

Poster Session

Location - Aula Nievo

Automatic Recognition of Road Sign “passo Carrabile”
Marmo Roberto, Lombardi Luca, Toccalini Andrea

Automatic Recognition of Road Signs by Hough Transform
Cacciola Matteo, Barrile Vincenzo, Morabito Francesco Carlo

Trajectory Tracking by DGPS-odometric Integration for Autonomous Vehicle with Industrial Application
Dal Forno Roberto, Badocco Sergio, Burlon Alessio

Catching a Dynamic Object in Real Time “application of Mobile Mapping in Object Tracking in Real Time”
A. S. Homainejad

MRERA (Minimum Range Error Algorithm): RFID - GNSS Integration for Vehicle Navigation in Urban Canyons
Mok Esmond, Retscher Guenther, Xia Linyuan

Mobile System for Vision Based Road Sign Inventory
Paletta Lucas, Seifert Christin, Benesova Wanda, Andreu Jean-philippe, Lypetskyy Yuriy, Hoedl Evelyn, Jeitler Andreas

Low Cost Mobile Surveying Technique with GPSsit
İbrahim Kalayci, Özsen Corumluoglu

Relational Strategies in Statistical Data Analysis: Mapping, Inferences, Clustering, Topologies, Matching
Mussio Luigi, Dante Valentina

Visualization of Building Models and Factual Data Integrated by Citygml
Kumke Holger, Stilla Uwe, Hoegner Ludwig, Meng Liqiu

Accuracy Enhancement of Helicopter Position with Low Cost System
Guarnieri Alberto, Pirotti Francesco, Vettore Antonio

Road’s Cadastre and Safety Evaluation GIS Realised with Data of a MMS Vehicle
Caroti Gabriella, Piemonte Andrea

Accuracy Check of Road’s Cross Slope Evaluation Using MMS Vehicle
Piemonte Andrea, Caroti Gabriella, Bolzon Giorgio
Comparison of Kinematic Parameters of a Moving Vehicle by GNSS Measurements and Inertial/gps Navigation System.
Radicioni Fabio, Fastellini Guido, Stoppini Aurelio, Schiavoni Armando

Mobile Mapping in GPS-denied Areas: a Hybrid Prototype
Gabriel Scarmana

Research and Training Staff, National Technical University of Athens, Greece
Hatzichristos Thomas

The Use of Radarsat and Landsat Image Fusion with Different Image Fusion Algorithms and Different Supervised Classification Methods for Increase Landuse Map Accuracy. Case Study: Sari Plain - Iran

Open Source Mobile GIS Solutions for Different Application Fields
Magni Diego, Brovelli Maria A.

Cadastral Application of Satellite Images with High Spatial Resolution in Eastern Island (chile)
Herrera Victor, Borcosque Jose

Detecting and Tracking Vehicles in a Roundabout
Artese Giuseppe

GPS-assisted Adjustment of Terrestrial Blocks
Forlani Gianfranco, Pinto Livio

A New Line-simplification Method
Mohammadi Ehsan

Road Sign Safety Identification Through the Use of a Mobile Survey System
Foy Stephen, Mcloughlin Simon, Deegan, Catherine; Mulvihill, Ciara; Fitzgerald, Conor; Markham, Charles

GPS Navigation for Precision Farming
Biagi Ludovico, Capra Alessandro, Castagnetti Cristina, Dubbini Marco, F. Unguendoli

Exploitation of Mobile Mapping for Creation of Survey Sketches
Kocab Milan, Cajthaml Tomas, Vanis Pavel

Semantic Integrity Constraint Violations Check for Spatial Database Updating
Kalum Priyanath Udagepola, Li Xiang, Aw. Wijeratne, Yang Xiaozong

Use of Mobile Mapping Technology for Post-disaster Damage Information Collection and Integration with Remote Sensing Imagery
Luca Gusella, Beverly J. Adams, Gabriele Bitelli
A BackPack Mobile Mapping Application  
*Ugo Coppa, Guarnieri Alberto, Pirotti Francesco, Vettore Antonio*

Commercial Marine-based Mobile Mapping and Survey Systems  
*Dave Adams*

Improving the Reliability of a GPS/INS Navigation Solution for MM Vehicles by Photogrammetry  
*Cazzaniga Noemi, Forlani Gianfranco, Roncella Riccardo*

On Using Qa/qc Techniques for LiDAR-IMU Boresight Misalignment  
*Pothou Anna, Toth Charles, Karamitsos Spiros, Pr. Georgopoulos Andreas*

Adaptive Approach to Mobile Cartography  
*Kamal Kant Mishra, Milap Punia, H.L. Minam*

**20:00**

**GALA DINNER**

Gala Dinner will be at the beautiful Rossini Room at the Pedrocchi Cafè, just in front of the conference location. This cafè is one of the oldest and nicest places both for the architecture and the internal design. Places for the dinner are limited so please communicate to us as soon as possible if you plan to attend. Price is 40 euro per person.
Thursday May 31

9:00 – 10:30
Parallel Oral Session A

Location - Aula Nievo

Mobile Mapping Technology (platforms, components etc...)
(Chair: Drs. Dorotha Brzezinska)

Calibration of a Non-contact Optical Velocity Sensor for a Precision Farming Application
Siemes Matthias, Kuhlmann Heiner

Implementation of a Low Cost Terrestrial Mobile Mapping System
Madeira Sergio, Gonçalves José Alberto, Bastos Luisa

Vehicle Based Waveform Laser Scanning in a Coastal Environment
Barber David, Mills Jon

Compact Airborne Image Mapping System (CAIMS)
Mccarthy Timothy, Fortheringham Asf, O’rian Gearoid

9:00 – 10:30
Parallel Oral Session B

Location - Archivio Antico

Estimation and Optimization Algorithms
(Chair: Dr. Fabio Crosilla)

Towards Total Kalman Filtering for Mobile Mapping
Schaffrin Burkhard, Iz H. Baki

Neural Network Aided Kalman Filtering for Integrated GPS/INS Geo-referencing Platform
Wang Jianguo, Wang Jinling, Sinclair David, Watts Leo

Development of an Intelligent Scheme for Rapid Imu Alignment Utilizing Artificial Neural Networks
Huang Yun-wen, Chiang Kai-wei

Fuzzy Logic-based Methodologies for Mobile Mapping: Enhancing Positioning Accuracy of GPS/GNSS Measurements
Crocetto Nicola, Ponte Salvatore, Savino Luigi
10:30 – 10:45
Coffee Break

10:45 – 12:45
Parallel Oral Session A
Location - Aula Nievo

Mobile Mapping Technology (platforms, components etc...)
(Chair: Dr. Alberto Guarnieri)

On-the-way City Mobile Mapping Using Laser Range Scanner and Fisheye Camera
Xavier Brun, Jean-emmanuel Deschaud, François Goulette

New Technologies for Mobile Mapping
Horea Bendea, Piero Boccardo, Sergio Dequal, Fabio Giulio Tonolo, Davide Marenchino

Mapping and 3D Modelling of Urban Environment Based on LiDAR, GPS/IMU and Image Data
Krzysztof Gajdamowicz, Milan Horemuþ, Daniel Öhman

Integration of LiDAR and Terrestrial Mobile Mapping Technology for the Creation of a Comprehensive Road Cadastre
Bomers Maarten, Fuser Roberto, Amoureus Luc, Tosatto Michela

10:45 – 12:45
Parallel Oral Session B
Location - Archivio Antico

Wireless Positioning Techniques
(Chair: Dr. Guenther Retscher)

Map Revise Technique by Using Collaboration of GPS and GIS
Moriya Mitoshi, Shikada Masaaki, Shimano Sota

The Next Step Towards Free Wireless Positioning Techniques for Mobile Phones
Rooney Seamus, Gardiner Keith Carswell James

Ubiquitous Positioning Solutions for Pedestrian Navigation
Retscher Guenther

Mobile Positioning for Traffic State Acquisition
Ramm Katrin, Schwieger Volker
Evaluation Results of Automated Schematic Map Tool for Mobilelbs Applications
Anand Suchith, Ware Mark, Jackson Mike

Mobility Model Based on Incoming and Outgoing Nodes to an Area
Aihara Satoshi, Sasabe Masahiro, Nakano Hirotaka

12:30 – 14:00
Lunch Break

14:00 – 15:30
Parallel Oral Session A
Location - Aula Nievo

3D Mobile Mapping and GIS Integration
(Chair: Dr. Vincent Tao)

Application of Mobile Mapping Technology and Real Time GIS for Ubiquitous Society
Shimano Sota, Shikada Masaaki, Moriya Mitoshi, Azuma Tastuo

Mobile Mapping Applications: Mobile Electromagnetic Coverage Calculation in GIS
Gumusay Umit, Sen Alper, Bulucu Umut, Aktul Kavas

A 3D Mobile Mapping System: Data Generation, Network Analysis, Simulation and Navigation
Karas Ismail Rakip, Batuk Fatmagul, Emem Ozan

Commercial High-Definition LiDAR/EO Ground Vehicle Mobile Mapping and Survey Systems
Philip Arsenault

14:00 – 15:30
Parallel Oral Session B
Location - Archivio Antico

Estimation and Optimization Algorithms
(Chair: Dr. Naser El-Sheimy)

INS-aided Odometry and Laser Scanning Data Integration for Real-time Positioning and Map-building of Skid-steered Vehicles
Anousaki Georgia, Kyriakopoulos Konstantinos, Gikas Vassilis
Design and Calibration of a Neural Network-based Adaptive Knowledge System for Multi-sensor Personal Navigation
Grejner-brzezinska Dorota, Charles Toth, Shahram Moafipoor, Jay Kwon

Enhancing INS/gps Integration Utilizing Dynamic Neural Network Model for Mobile Mapping Applications
Noureldin Aboelmagd, El-Shafie Ahmed, Tarbouchi Mohammed, El-Sheimy Naser

A Filtering Algorithm for SAR Images Based on MTF
Hu Qingwu, Li Qingquan

15:30 – 15:45
Coffee Break

15:45 – 17:45
Parallel Oral Session A

Location - Aula Nievo

3D Mobile Mapping and GIS Integration
(Chair: Dr. Krzysztof Gajdamowicz)

A Mobile Indoor Location-based GIS Application
Candy Jonathan

GIS Integration of Data Collected by Mobile GPSit
Durduran S.şavaş, Kalaycı Ibrahim, Çorumluoğlu Özşen

Integrating Mobile Geo Sensors into Collaborative Virtual Globes – Design and Implementation Issues
Nebiker Stephan

Mobile GIS Application in Urban Areas and Forest Boundaries – a Case Study
Turk Tarik, Hastaoglu Kemal Ozgur

15:45 – 17:45
Parallel Oral Session B

Location - Archivio Antico

Sensor Calibration – Orientation Integration and Reliability
(Chair: Dr. Harald Sternberg)

Camera Calibration for a Robust Omni-directional Photogrammetric System
Fuad Khan, Michael Chapman, Jonathan Li
Calibration of a Mobile Mapping Camera System with Photogrammetric Methods
Scheller Steffen, Westfeld Patrick, Ebersbach Dirk

In-situ Camera and Boresight Calibration with LiDAR Data
Yastikli Naci, Toth Charles, Grejner-Brzezinska Dorota A.

Qualification Process for MEMS Gyroscopes for the Use in Navigation Systems
Sternberg Harald, Schwalm Christian

Towards Automated LiDAR Boresight Self-calibration
Skaloud Jan, Schaer Phillip

18:00
Closing Ceremony
Sponsors

FIG                  ISPRS                  IAG

Provincia di Padova

UNIVERSA
UNIVERSIS
PATAVINA
LIBERTAS

UNIVERSITY OF
CALGARY

Air Data

SIFET

Ohio State University

Applanix

Trimble

Intermap

ISPRS IC WG V/I - "Integrated Mobile Mapping Systems"
ISPRS IC WG I/V - "Autonomous Vehicle Navigation"
ISPRS WG I/3 - "Multi-Platform Sensing and Sensor Networks"
ISPRS WG I/2 - "LiDAR and SAR Systems"
FIG WG5.3 - "Integrated Positioning, Navigation and Mapping Systems"
IAG WG SC4.1 - "Mobile Multi-Sensor Systems"
ISPRS WG II/6 - "System Integration and Interoperability"

MAIN SPONSOR: Leica Geosystems

Leica
Geosystems
The location of the conferenze is at Palazzo Bo, Via VIII Febbraio n°2 in Padova’s old city center.

Sessions will be in Aula Nievo (ground floor), Aula Magna (1st floor) and Archivio Antico (1st floor)
General Information

Location
The Mobile Mapping Technologies Symposium takes place in the city of Padua, Italy. The building where conferences are held is the central location of the University of Padua, the Bo.

Dates
The Symposium starts in the morning on Tuesday May 29th and ends on Thursday May 31st. The Mobile Mapping Systems Tutorial will take place on Monday May 28th.

Attendance Certificate
Attendance certificates will be available at the welcome desk upon request.

Badges
Badges have to be worn at all time. Color codes define participants:
red: staff
yellow: participants
green: invited participants

Coffee Breaks
They will be located at different areas in the building next to session rooms.

Welcome Party
For all participants ice-breaking party will take place at the conference location on Tuesday May 29th at 17:30.

Dinner Gala Dinner
Please let us know if you are planning to attend the Dinner Gala Party as places are limited! Price - 40 euro per person. Date - Thursday 30th 20:00 - Location - it will be at the beautiful Rossini Room at Pedrocchi caffè

Guided Tours
Open guided tours will be made at the Palazzo Bo during conference duration. Guided tour of the Scrovegni Chapel is available for those interested but must be booked by participant.