

**2<sup>nd</sup> International Workshop**

**“INTEGRATION OF POINT- AND AREA-WISE GEODETIC  
MONITORING FOR STRUCTURES AND NATURAL OBJECTS”**

**23. - 24. March 2015, Stuttgart, Germany**

***TECHNICAL PROGRAM***



**Siberian State University of Geosystems and Technologies**



**University of Stuttgart, Institute of Engineering Geodesy**

**Organizers:**

Siberian State University of Geosystems and Technologies, Novosibirsk, Russian Federation  
Institute of Engineering Geodesy, University of Stuttgart, Germany

**In collaboration with:**

University of Applied Sciences Karlsruhe, Germany

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## **General information**

Monitoring of structures and natural objects with regard to movements and deformations is one of the main tasks of engineering geodesy. The object of interest can be monitored with a specific measurement technique at specific individual points and at specific time. The point-based methods, like GNSS or total station, provide highly precise information for individually characterized points. The area-based methods, like Terrestrial Laser Scanning or Photogrammetry, provide the complete shape of the object with a high resolution but very often with a reduced accuracy. The accuracy and reliability of the area wise measurement methods can be improved through the precise point wise measurement methods. On the basis of those considerations the first international workshop took place in Novosibirsk, Russian Federation on 14. - 15. April 2014.

During the first workshop numerous monitoring objects and specific measurement techniques as well as area-wise evaluation methods were presented and discussed. Keywords like multi-sensor integration, change detection, geometric, semantic and dynamic modelling could be identified as future research fields.

On 23.- 24. March 2015 the second international workshop on “Integration of Point- and Area-wise Geodetic Monitoring for Structures and Natural Objects” will take place in Stuttgart, Germany. The event serves as an opportunity for further development of ideas and solutions with respect to monitoring tasks that were analyzed and discussed during the first meeting.

The main focus on the measurement side will be on Global Navigation Satellite Systems, Laser Scanning and Photogrammetry. 3-D Object Modelling and different integrated deformation analysis approaches will be the main part on the modelling and analysis side.

The objects under observation can be: Industrial and civilian, public utilities (hydro technical constructions, atomic and thermal power plants), mining plants, minery, shafts, tunnels, linear structures (highways, roads, pipelines, power transmission lines), landslides, glaciers, etc.

This workshop aims at strengthening the scientific elaboration among the Siberian State University of Geosystems and Technologies, the University of Stuttgart, the University of Applied Sciences Karlsruhe and the technet-rail 2010 GmbH. Mainly young scientists who present their researches and their projects will participate. Joint research activities should be identified and future projects should be developed.

## ***TECHNICAL PROGRAM***

<b>MONDAY, 23.03.2015</b>	
09:00 - 09:30	Registration of participants and visitors
09:30 - 10:00	<p style="text-align: center;">Opening Ceremony of the workshop</p> <p style="text-align: center;"><b>2<sup>nd</sup> International workshop on “Integration of Point- and Area-wise Geodetic Monitoring for Structures and Natural Objects”</b></p> <ul style="list-style-type: none"> <li>• Prof. <b>Stephan Staudacher</b>, Dean of Faculty for Aerospace Engineering and Geodesy, University of Stuttgart, Germany</li> <li>• <b>Christine Müller</b>, International Affairs, University of Stuttgart, Germany</li> <li>• Prof. <b>Vladimir A. Seredovich</b>, Siberian State University of Geosystems and Technologies, Russian Federation</li> <li>• Prof. <b>Volker Schwieger</b>, University of Stuttgart, Germany</li> </ul>
10:00 - 11:00	<p style="text-align: center;"><b>TECHNICAL SESSION 1: 3-D Object Monitoring and Modelling</b></p> <p><u>Chair:</u> <u>Prof. <b>Vladimir A. Seredovich</b>, Siberian State University of Geosystems and Technologies, Russian Federation</u></p> <p><b>Andrey V. Sementsov, Vyacheslav N. Nikitin, Alexander Yu. Chermoshentsev</b>, Siberian State University of Geosystems and Technologies, Russian Federation <b>3D Object Modelling from Images taken by Non-Metric Digital Cameras: Problems and their Solutions</b></p> <p><b>Reiner Jäger</b>, University of Applied Sciences Karlsruhe, Germany <b>Geometry &amp; Gravity Space related 3D Integrated Geomonitoring - Feasibility, Advantages and Implementation into the GOCA-System</b></p> <p><i>POSTER CONTRIBUTION:</i> <i><b>Evgeny I. Avrunev, Elena S. Plyusnina</b>, Siberian State University of Geosystems and Technologies, Russian Federation, <b>Deformation Model-Building for Engineering Objects</b></i></p>
11:00 - 11:30	<b>COFFEE BREAK</b>
11:30 - 12:30	<p><b>Dmitry N. Vetoshkin, Sergey R. Gorobtsov</b>, Siberian State University of Geosystems and Technologies, Russian Federation <b>3D Monitoring of Fixed Assets under Construction for the Purpose of Consistent Cadastral Registration</b></p> <p><b>Tatyana Yu. Bugakova, Mariya M. Shlyakhova, Alexander V. Seredovich, Andrei V. Ivanov, Oksana R. Miftakhudinova</b>, Siberian State University of Geosystems and Technologies, Russian Federation <b>3D Modelling and Visualizing Surface Deformations of Man-Made Objects</b></p> <p><i>POSTER CONTRIBUTION:</i> <i><b>Alexey V. Dubrovsky, Olesya I. Malygina</b>, Siberian State University of Geosystems and Technologies, Russian Federation <b>Topographic Monitoring on Oil-and-Gas Fields</b></i></p>

12:30 - 13:30	<b>LUNCH</b>
13:30 - 15:00	<b>TECHNICAL SESSION 2: GNSS- SOLUTIONS I</b>
	<p><u>Chair:</u>  <b>Prof. Volker Schwieger</b>, University of Stuttgart, Germany</p> <p><b>Julia Diekert</b>, University of Applied Sciences Karlsruhe, Germany  <b>New Developments and Applications for Low Cost GNSS/MEMS-based Monitoring</b></p> <p><b>Alexander P. Karpik, Leonid A. Lipatnikov</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Application of Low Cost GNSS Equipment for Geodetic Monitoring of Engineering Structures and Natural Objects</b></p> <p><b>Ashraf Abdallah</b>, Institute of Engineering Geodesy, University of Stuttgart, Germany  <b>The Effect of Convergence Time on the Static- PPP Solution</b></p>
15:00 - 15:30	<b>COFFEE BREAK</b>
15:30 - 17:00	<b>TECHNICAL SESSION 3: GNSS- SOLUTIONS II</b>
	<p><u>Chair:</u>  <b>Andrei Ivanov, Ph.D.</b>, Siberian State University of Geosystems and Technologies, Russian Federation</p> <p><b>Joël van Cranenbroeck</b>, Creative Geosensing sprl-s, Belgium, Europa  <b>Mariya M. Shlyakhova</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Significant Contribution of Compass/Beidou New Chinese GNSS Constellation for Monitoring Applications</b></p> <p><b>Wei Zhang, Li Zhang</b>, University of Stuttgart, Germany  <b>Time Series Analysis of Different Shieldings of Low Cost GPS Receiver</b></p> <p><b>Li Zhang</b>, University of Stuttgart, Germany  <b>Reducing Multipath Effects by Considering Spatial Correlations</b></p>
17:00 - 18:00	<b>TIME FOR DISCUSSIONS DAY 1</b>

<b>TUESDAY, 24.03.2015</b>	
09:00 - 10:30	<b>TECHNICAL SESSION 4: Laser Scanning Applications</b>
	<p><u>Chair:</u>  <u>Prof. <b>Reiner Jäger</b>, University of Applied Sciences Karlsruhe, Germany</u></p> <p><b>Maxim A. Altyntsev, Vladimir A. Seredovich</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Accuracy Analysis of DEM Generation and Computing Volumes of Excavation and Rock Fillings by Laser Scanning Data</b></p> <p><b>Ekaterina I. Gorokhova</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Geomonitoring of Engineering Structures and Forecasting Their Deformations Using Laser Scanning Data</b></p> <p><b>Desislava Staykova, Nico Zill</b>, technet-rail 2010 GmbH, Germany  <b>Kinematic and Static Laser Scanning Methods for Infrastructure Monitoring</b></p>
10:30 - 11:00	<b>COFFEE BREAK</b>
11:00 - 12:30	<b>TECHNICAL SESSION 5: Modeling for Laser Scanning</b>
	<p><u>Chair:</u>  <u>Dr. <b>Ivo Milev</b>, technet-rail 2010 GmbH, Germany</u></p> <p><b>Stephanie Kauker</b>, University of Stuttgart, Germany  <b>Approach for a Synthetic Covariance Matrix for Terrestrial Laser Scanner</b></p> <p><b>Bimin Zheng, Lifan Zhang</b>, University of Stuttgart, Germany  <b>Implementation and Comparison of Different Filters for TLS Point Clouds</b></p>
12:30 - 13:30	<b>LUNCH</b>
13:30 - 15:00	<b>TECHNICAL SESSION 6: Geometric and Deformation Analysis</b>
	<p><u>Chair:</u>  <u><b>Joël van Cranenbroeck</b>, Creative Geosensing sprl-s, Belgium</u></p> <p><b>Sergey G. Mogilny</b>, Prydniprov's'ka State Academy of Civil Engineering and Architecture, Department of Land Management, Road-Building and Geodesy, Ukraine, <b>Andrii A. Sholomytskyi, Vladimir A. Seredovich, Alexander V. Seredovich, Andrei V. Ivanov</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>The Analysis of Methods for Determining the Geometric Parameters of Rotating Machines</b></p> <p><b>Annette Schmitt</b>, University of Stuttgart, Germany  <b>Deformation Analysis of a Timber Pavilion</b></p>

	<p><i>POSTER CONTRIBUTIONS:</i></p> <p><b>Boris T. Mazurov</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Fawzi Zarzoura, Samira Ahmed</b>, Mansoura University, Egypt  <b>Deformation Analysis of Cable-Stayed Bridges Using Neural Networks</b></p> <p><b>Igor G. Vovk</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Positioned Displacements of Engineering Constructions and Natural Objects Obtained from Geodetic Monitoring</b></p>
14:00 - 14:30	<b>COFFEE BREAK</b>
14:30 - 15:30	<b>TECHNICAL SESSION 7: Optical Methods for Street Mapping</b>
	<p><u>Chair:</u></p> <p><u>Dr. Martin Metzner</u>, University of Stuttgart, Germany</p> <p><b>Rolf Kemper-Böninghausen</b>, Emscher Genossenschaft, <b>Nico Zill</b>, technet-rail 2010 GmbH, Germany  <b>Street Inventory Based on Mobile Laser Scanning</b></p> <p><b>Bara Al-Mistarehi</b>, Institute of Engineering Geodesy, University of Stuttgart, Germany  <b>Automated Detection for Pavement Crack for Mobile Mapping Data</b></p> <p><i>POSTER CONTRIBUTION:</i></p> <p><b>Tatyana Yu. Bugakova</b>, Siberian State University of Geosystems and Technologies, Russian Federation  <b>Modelling of Spatio-Temporal Variations for Engineering Structures and Natural Objects by Geodetic Monitoring Data</b></p>
15:30 - 16:00	<b>DISCUSSIONS AND CONCLUSIONS, CLOSURE OF THE WORKSHOP</b>