

# Contents

## A. OVERVIEW ARTICLES

High Precision Navigation with Satellites Philipp Hartl	3
Navigational Methods of Measurement in Geodetic Surveying Klaus Linkwitz, Wolfgang Möhlenbrink	15
Geodetic Positioning by Inertial and Satellite Systems: An Overview Erik W. Grafarend	34
GPS Geodesy: A Status Report G. Blewitt, T.P. Yunck, S.M. Lichten, W.I. Bertiger, S.C. Wu	74
Vehicle Guidance by Computer Vision Ernst-Dieter Dickmanns	86
Vision and Navigation for the Carnegie Mellon Navlab Charles Thorpe, Martial Hebert, Takeo Kanade, Steven Shafer	97
Error Characteristics of Inertial Systems from the View- point of Oscillation Theory Elfriede Knickmeyer, Klaus-Peter Schwarz	123
Integration of INS and GPS Measurements Alfred Kleusberg	137

## B. SATELLITE TECHNIQUES

Adaptive Antennas for GPS Samuel Bloch	149
Empirical Accuracy of Positions Computed from Airborne GPS Data Peter Friess	163
Integrated Navigation System for Approach Guidance for Regional Air-Traffic Using GPS Thomas Jacob	176

GPS Receiver Development in the Space Research Centre Warsaw Zdzislaw J. Krysiński, Janusz B. Zieliński	188
The Monocular Electro-Optical Stereo Scanner (MEOSS) Satellite Experiment Franz Lanzl	195
Alternative Modeling of GPS Carrier Phases for Geodetic Network Analysis Wolfgang Lindlohr	205
Frontend Design for High Accurate Positioning with GPS Guenther Schneck	218
Combining GPS and Classical Geodetic Surveys for Crustal Deformation in the Imperial Valley, California Richard A. Snay, Alice R. Drew	225

### C. TOPOGRAPHIC APPLICATIONS

Digital Terrain Models of Forest Areas by Airborne Laser Profiling Friedrich Ackermann	239
Advances in Radar Altimetry Techniques for Topographic Mapping Hugh Griffiths	251
A KU-Band Solid State Radar Altimeter for Topographic Application Yong-Hoon Kim	261
Quality Analysis of Platform Orientation Parameters for Airborne Laser Profiling Systems Joachim Lindenberger	275
Radar Altimetry for Land Applications Harald Schüssler	286

D. IMAGE PROCESSING

Motion Estimation in Image Sequences Norbert Diehl, Hans Burkhardt	297
Precision of Geometric Features Derived from Image Sequences Wolfgang Förstner	313
Towards Autonomous Navigation Utilizing Image Sequence Analysis Ralf Kories, Nils Rehfeld, Georg Zimmermann	330
Depth from Stereo Image Sequences Larry Matthies	342
Systolic Arrays for Block Matching Algorithms Peter Pirsch, Thomas Komarek	354
Modulation Transfer Function Obtained from Image Structures Fang Lei, Hans Tiziani	366
Symbolic Image Descriptions for Relational Matching George Vosselman	378

E. CLOSE RANGE MENSURATION

Motorized Electronic Theodolites - High Precision Measurement Robots for Surveying Gerhard Bayer	395
High Speed Infrared Tracking Yves Castanet	409
High Precision Surveying of Moving Objects by Electronic Cameras Peter Krzystek	419
Pulsed Laser Radar for Close Range Operation in Space Sigmund Manhart, Peter Autenzeller, Walter Braumandl	432

Real-Time Surveying in Close Range Area with Inertial Navigation Systems and Optical Target Tracking Techniques Wolfgang Möhlenbrink	443
Multiple Target Tracking for Automatic Inland Navigation Thomas Plocher, Klaus Mezger, Reinhard Neul, Ernst-Dieter Gilles	457
3D-Mapping by a Semiconductor Laser Scanner, Description of an Experimental Setup Aloysius Wehr	469

#### F. INERTIAL TECHNIQUES

A Model for Highly Precise Inertial-Survey Adjustments (Summary) Wolfgang Hausch	493
Advances in Strapdown Systems for Geodetic Applications James R. Huddle	496
Some Experiences with the LTN-72 Aircraft Platform in Terrestrial Applications Dieter Keller	531
Separation of Gravitational and Inertial Accelerations with a Combined Inertial Navigation and Gravity-Gradiometer System Thomas Kling	542
The Physics of NMR Gyroscopes Michael Mehring, Stephan Appelt, Bodo Menke, Peter Scheufler	556
Data Processing for GPS/INS Integration Michael Napier	571
Integration of INS, GPS and Doppler for Helicopter Navigation Bruno M. Scherzinger, D. Blake Reid	584

- Highly Stabilized Infrared Diode-Laser for Optical  
Pumping of Rb-Xe-NMR Gyroscope 602  
Peter Scheufler, Klaus-Dieter Dünnebeil,  
Thomas Vetter, Michael Mehring
- Comparative Study of Inertial Measurement Systems for  
Geodetic Applications 611  
Dietrich Schröder