



Institute for Photogrammetry

Geschwister-Scholl-Str. 24D, D-70174 Stuttgart,
Tel.: +49 711 685 83386, Fax: +49 711 685 83297
e-mail: firstname.secondname@ifp.uni-stuttgart.de
url: <http://www.ifp.uni-stuttgart.de>

Head of Institute

Director: Prof. Dr.-Ing. Dieter Fritsch
Deputy: apl. Prof. Dr.-Ing. Norbert Haala
Personal Assistant: Martina Kroma

Professor Emeritus: Prof. i.R. Dr. mult. Fritz Ackermann

Research Groups at the ifp:

Geoinformatics

Chair: Prof. Dr.-Ing. Dieter Fritsch
Deputy: Dr.-Ing. Volker Walter
Dr.-Ing. Susanne Becker

Geographic Information Systems
Point Cloud Interpretation and Hybrid GIS

Photogrammetry and Computer Vision

Chair: Prof. Dr.-Ing. Dieter Fritsch
Deputy: Dr.-Ing. Michael Cramer
Dipl.-Ing. Alessandro Cefalu
Dipl.-Ing.(FH) Markus English
M.Sc. Eng. Ali Mohammed Khosravani
M.Sc. Eng. Wassim Moussa
M.Sc. Eng. Mohammed Othman
Dipl.-Ing. Michael Peter
Dipl.-Ing. Konrad Wenzel

Digital Airborne Sensors
Photogrammetric Calibration and Object Recognition
Sensor Laboratory, Computing Facilities
Indoor Modeling and Positioning
Terrestrial Laser Scanning and Sensor Fusion
Image Orientation by Structure-from-Motion
Indoor Positioning
Dense Image Matching in Close Range Applications

Photogrammetric Image Processing

Chair: apl. Prof. Dr.-Ing. Norbert Haala
Dipl.-Ing. Mathias Rothermel
Dipl.-Ing. Patrick Tutzauer

Semi-Global Matching
Façade Reconstruction, Interpretation and Modelling

External Teaching Staff

Dipl.-Ing. Stefan Dvorak, Amt für Stadtentwicklung und Vermessung, Reutlingen

References 2013

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- Becker, S., Peter, M., Fritsch, D., Phili, D., Baier, P., Dibak, C.: Combined Grammar for the Modeling of Building Interiors, *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, II-4/W1, 1-6.
- Blanco-Vogt, A., Haala, N., Schanze, J.: Building extraction from remote sensing data for parameterizing a building typology: a contribution to flood vulnerability assessment. In: *Proceedings JURSE Conference*, Sao Paulo, April 21-23, 147-150.
- Budroni, A., Fritsch, D.: An Automatic Method to 3D Model Generation from Point Clouds. In: *Terrestrisches Laserscanning - TLS. Schriftenreihe Band 72, DVW e.V. - Gesellschaft für Geodäsie, Geoinformation und Landmanagement*, 15 S.
- Cefalu A., Abdel-Wahab M., Peter M., Wenzel K., Fritsch, D.: Image based 3D Reconstruction in Cultural Heritage Preservation. In: *Proceedings of the 10th International Conference on Informatics in Control, Automation and Robotics*, 201-205.
- Cramer, M.: The UAV@LGL BW Project - A NMCA Case Study. In: Fritsch, D. (Ed.): *Photogrammetric Week '13*, Wichmann, Berlin/Offenbach, 165-179.
- Cramer, M., Bovet, S., Gültlinger, M., Honkavaara, E., McGill, A., Rijdsdijk, M., Tabor, M., Tournadre, V.: On the Use of RPAS in National Mapping - EuroSDR UAV-g, 6. September, Rostock, Germany, *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XL-1/W2, 93-99.
- Cramer, M., Haala, N., Rothermel, M., Leinss, B., Fritsch, D.: UAV@LGL - Pilotstudie zum Einsatz von UAV im Rahmen der Landesvermessung in Deutschland. *Photogrammetrie - Fernerkundung - Geoinformation (PFG)*, Heft 5, 495-509.
- Cramer, M., Haala, N., Rothermel, M., Leinss, B., Fritsch, D.: UAV-gestützte Datenerfassung für Anwendungen der Landesvermessung - das Hessigheim-Projekt. *Tagungsband Vorträge 33. Wissenschaftlich-technische Jahrestagung DGPF, Publikationen der Deutschen Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation (DGPF) e.V.*, Band 22, 450-469.
- Cramer, M., Schwieger, V., Fritsch, D., Keller, W., Kleusberg, A., Sneeuw, N.: GEOENGINE - The University of Stuttgart International Master's Program with more than 6 Years of Experience. In: *Proceedings of FIG Working Week*, Abuja, Nigeria, 6-10 May, 19 p.

- Doulamis, A., Ioannides, M., Doulamis, N., Hadjiprocopis, A., Fritsch, D., Balet, O., Julien, M., Protopapadakis, E., Makantasis, K., Weinlinger, G., Johnsons, P.S., Klein, M., Fellner, Stork, A., Santos, P.: 4D Reconstruction of the Past. Pres. Paper 1st International Conference on Remote Sensing and Geoinformation of Environment, Paphos, Cyprus, 4p.
- Fritsch, D.: The Future of EduServ. White Paper EuroSDR, EuroSDR Web access: www.euroedr.net, 10p.
- Fritsch, D. (Ed.): Photogrammetric Week '13. Wichmann, Berlin/Offenbach, 352p.
- Fritsch, D., Madden, M., Trinder, J.: Annual Report 2012, The ISPRS Foundation, www.isprs.org/foundation, 28p.
- Fritsch, D.: Management of EuroSDR Workshops and Projects. White Paper EuroSDR, www.euroedr.net, 11p.
- Fritsch, D., Cramer, M.: The Relevance of RPAS for National Mapping and Cadastre Agencies in Europe. In: RPAS Remotely Piloted Aircraft Systems - The Global Perspective 2014, Blyneburgh & Co., Paris, 115-118.
- Fritsch, D., Grimm, A., Kremer, J., Rothermel, M., Wenzel, K.: Bilddatenerfassung mit einem Gyrocopter - Erste Erfahrungen zur „Photogrammetrie nach Bedarf“. Tagungsband Vorträge 33. Wissenschaftlich-technische Jahrestagung DGPF, Publikationen der Deutschen Gesellschaft für Photogrammetrie, Fernerkundung und Geoinformation (DGPF) e.V., Band 22, 470-480.
- Fritsch, D., Pfeifer, N., Franzen, M. (Eds.): 2nd High Density Image Matching for DSM Computation Workshop. EuroSDR Workshop Proceedings, EuroSDR Publication No. 63, ISSN 0257-0505, ISBN 9789051798032 (CD-ROM).
- Fritsch, D., Rothermel, M.: Oblique Image Data Processing - Potential, Experiences and Recommendations. In: Fritsch, D. (Ed.): Photogrammetric Week '13, Wichmann, Berlin/Offenbach, 73-88.
- Fritsch, D., Becker, S., Rothermel, M.: Modeling Facade Structures Using Point Clouds from Dense Image Matching. Proceedings Intl. Conf. Advances in Civil, Structural and Mechanical Engineering, Inst. Research Eng. and Doctors. August 3-4, Hongkong, 57-64.
- Fritsch, D., Rothermel, M., Wenzel, K., Walter, V., Becker, S., Cramer, M., Haala, N.: All About 3D Modelling - From 2.5D Meshes to 3D Virtual Reality Models. Lecture Notes, Tutorial PhoWo. Institute for Photogrammetry, Univ. Stuttgart, 600p.
- Haala, N.: The Landscape of Dense Image Matching Algorithms. In: Fritsch, D. (Ed.): Photogrammetric Week '13, Wichmann, Berlin/Offenbach, 271-284.
- Haala, N., Cramer, M., Rothermel, M.: Quality of 3D Point clouds from highly overlapping UAV Imagery. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-1/W2, 183-188.
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- Ivan, I., Longley, P., Horák, J., Fritsch, D., Cheshire, J., Inspektor, T. (Eds.): Geoinformatics for City Transformations. Proceedings 10. International Symposium Ostrava, Czech Republic, January, Technical University of Ostrava, 298 p.
- Khosravani, A.M., Peter, M., Fritsch, D.: Alignment of Range Image Data Based on MEMS IMU and 3D Coarse Models derived from Evacuation Plans. In SPIE Videometrics, Range Imaging, and Applications XII. Vol. 8791A, 1-6.
- Moussa, W., Wenzel, K., Rothermel, M., Abdel-Wahab, M., Fritsch, D.: Complementing TLS Point Clouds by Dense Image Matching. Int. Journal of Heritage in the Digital Era, Vol. 2, No. 3, 453-470.
- Peter, M., Becker, S., Fritsch, D.: Grammar Supported Indoor Mapping. In: Proceedings of the 26th International Cartographic Conference, 1-18.
- Peter, M., Khosravani, A.M., Fritsch, D.: Refinement of Coarse Indoor Models Using Position Traces and a Low-Cost Range Camera. In: Proceedings of the 4th International Conference on Indoor Positioning and Indoor Navigation, 787-795.
- Tang, R., Fritsch, D.: Correlation Analysis of Camera Self-Calibration in Close Range Photogrammetry. The Photogrammetric Record, Special Issue: DIAMOND JUBILEE ISSUE, Volume 28, Issue 141, 86-95.
- Walter, V., Fritsch, D.: Results of the EuroSDR Survey: 3D Data Management in European National Mapping and Cadastral Agencies. INSPIRE Conference, Florence, Italy, Published online: http://inspire.jrc.ec.europa.eu/events/conferences/inspire/_schedule/submissions/20.html
- Walter, V., Luo, F., Fritsch, D.: Automatic Map Retrieval and Map Interpretation in the Internet. In: Timpf, S., Laube, P.: Advances in Spatial Data Handling - Geospatial Dynamics, Geosimulation and Exploratory Visualisation, Springer, New York, 209-221.
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- Wenzel, K., Rothermel, M., Haala, N., Fritsch, D.: SURE - The ifp Software for Dense Image Matching. In: Fritsch, D. (Ed.): Photogrammetric Week '13, Wichmann, Berlin/Offenbach, 59-70.

Doctoral Theses

- Budroni, A.: Automatic Model Reconstruction of Indoor Manhattan-World Scenes from Dense Laser Range Data. Deutsche Geodätische Kommission, Reihe C, Nr. 715, München, ISBN 978-3-7696-5127-0, 104 S.

Tang, R.: Mathematical Methods for Camera Self-Calibration in Photogrammetry and Computer Vision. Deutsche Geodätische Kommission, Reihe C, Nr. 703, München, ISBN 978-3-7696-5115-7, 111 S.

Diploma Theses / Master's Theses

- Lingenfelder, M.: Qualifizierung des ShapeDrive 3D-Sensors integriert in die EVT-Bildverarbeitungs-Software für Prüfaufgaben in der automobilen Fertigung und Montage. Supervisors: Bürkle, H. (Daimler AG), Haala, N.
- Morosan, R.: Digital Preservation of the Aurelius Church and the Hirsau Museum Complex by Means of HDS and Photogrammetric Texture Mapping. Supervisor: Fritsch, D.
- Küver, M.: Descriptor-based Edge Feature Matching. Supervisors: Ohr, F. (Robert Bosch GmbH), Haala, N.
- Liu, Z.: Conflation of National Mapping and Crowd-Sourced Data - a comparison of two different approaches. Supervisor: Walter, V.
- Olaniyi, O.: Client/Server - based Indoor Positioning with WLAN. Supervisors: Walter, V., Peter, M.
- Shi, R.: Development of a Mobile Campus Information System. Supervisor: Walter, V.
- Li, J.: Digital Preservation of the Neighborhood of St. Peter & Paul by Means of Automated HDS and Photogrammetric Texture Mapping. Supervisor: Fritsch, D.
- Dong, D.: Indoors and Outdoors Data Collection and Refinement - The Kentheim Project. Supervisor: Fritsch, D.
- Bustamante T.A.: Digital Preservation of the Calw Market by Means of Automated HDS and Photogrammetric Texture Mapping. Supervisor: Fritsch, D.
- Fu, H.: Dense Matching GPU Implementation. Supervisor: Rothermel, M., Haala, N.
- Cheng, P.: Entwicklung eines Routenalgorithmus für Elektrofahrzeuge zur Energieversorgung unter Berücksichtigung von digitalen Geländemodellen. Supervisors: Walter, V., Wartsch, S. (Bertrandt Ingenieurbüro GmbH).
- Cui, Y.: Radargrammetry by Semi-Global Matching with TerraSAR-X data over Trento, Italy. Supervisors: Balz, T. (Wuhan University), Haala, N.
- Zwoelfer, T.: Face Recognition for a Mobile Service Robot. Supervisors: Haala, N., Bormann, R. (Fraunhofer IPA).
- Tutzauer, P.: Grid-Based Road Surface Estimation for Active Suspension Systems. Supervisors: Haala, N., Wehking, T. (Robert Bosch GmbH).
- Fang, Y.: Aufbau einer Innenraum-Ortung für ein bedarfsorientiertes Beleuchtungssystem (Developing an indoor-positioning system for a demand oriented lighting system). Supervisors:

Haala, N., Boer, J. (Fraunhofer Institut für Bauphysik), Aktuna, B. (Fraunhofer Institut für Bauphysik).

Cobalas, C.: Vergleich von Geodaten auf lokalen und internationalen Web-Portalen. Supervisors: Cramer, M., Gruber, M. (Microsoft/Vexcel Imaging GmbH).

Gao, Y: Optimisation of Service following in Automotive Radio by Applying a Reception Landscape Memory. Supervisors: Fritsch, D., Schmidt, A., Eireiner, T. (Daimler Research Ulm).

Study Theses / Bachelor Theses

Wenk, M.: Automatisierte Kamerakalibrierung. Supervisor: Wenzel, K.

Gaube, M.: Color Head-to-Head Image Registration using Correlation and Mutual Information. Supervisors: Haala, N., Hefele, J. (Hexagon Geosystems)

Fang, M.: Entwicklung eines Campus-Informationssystems mittels GIS Cloud. Supervisor: Walter, V.

Weimer, A.: Korrektur der chromatischen Aberration mittels radialsymmetrischer Verzeichnungsterme. Supervisor: Cefalu, A.

Lingenfelder, M.: Design and Evaluation of a Point Cloud Recording Device using Dense Image Matching and Registration in Object Space. Supervisor: Wenzel, K.

Xie, D.: Genauigkeitsanalyse dichter 3D Punktwolken aus UAV-Befliegungen. Supervisor: Rothermel, M.

Guo, Y.: 3D-Rekonstruktion des Klosters Hirsau mittels Terrestrischen Laserscanning und Nahbereichsphotogrammetrie. Supervisor: Fritsch, D.

Activities in National and International Organizations

Cramer, M.:

Co-Chair ISPRS ICWG III/I: Sensor Modeling for Integrated Orientation and Navigation

Englich, M.:

Webmaster ISPRS

Fritsch, D.:

Chairman Board of Trustees 'The ISPRS Foundation'

Member CyberOne Award Committee

Member Galileo/GMES Award Committee Baden-Württemberg

Member Jury Artur Fischer Invention Award

Member D21 Advisory Board

Member Board of Trustees German University in Cairo (GUC)

Member GUC Academic Advisory Committee

Memner GUC Academic Promotion Committee
Member Apple's University Education Forum (UEF)
Vice-President Research EuroSDR

Haala, N.:
Chair ISPRS WG I/2 - LiDAR, SAR and Optical Sensors
Vorsitz DGPF Arbeitskreis Sensorik und Plattformen

Walter, V.:
Member of Editorial Advisory Board of the ISPRS Journal of Photogrammetry and Remote Sensing
Nationaler Berichterstatter für die ISPRS Kommission IV

Awards

Haala, N.: Carl Pulfrich Award 2013

Education - Lectures/Exercises/Training/Seminars

Bachelor „Geodäsie und Geoinformatik“

Adjustment Theory I (Fritsch, Sneeuw)	1/1/0/0
Adjustment Theory II (Fritsch, Sneeuw)	2/2/0/0
Geoinformatics I (Fritsch, Walter)	2/2/0/0
Geoinformatics II (Walter)	1/1/0/0
Image Processing (Haala)	2/1/0/0
Integrated Fieldworks (Fritsch, Sneeuw, Keller, Kleusberg)	0/0/4/0
Introduction into Geodesy and Geoinformatics (Cramer, Fritsch, Sneeuw, Keller, Kleusberg)	4/2/0/0
Photogrammetry (Cramer)	2/1/0/0
Signal Processing (Fritsch)	2/1/0/0
Urban Planning (Dvorak)	2/0/0/0

Master Course „Geodäsie und Geoinformatik“

Aerotriangulation (Cramer)	1/1/0/0
Close Range Photogrammetry and Machine Vision (Fritsch)	1/1/0/0
Computational Geometry (Walter)	1/1/0/0
Computer Vision for Image-based Acquisition of Geodata (Haala)	1/1/0/0
Databases and Geographical Information Systems (Walter)	1/1/0/0
Digital Terrain Models (Haala)	1/1/0/0
Fundamentals in Urban Planning (Dvorak)	2/0/0/0

Georeferencing of photogrammetrical Systems (Cramer)	1/1/0/0
Modelling and Visualisation (Haala)	1/1/0/0
Pattern Recognition and Image Understanding (Haala)	1/1/0/0
Scientific Presentation Seminar (Haala)	0/0/0/2
Terrestrial Laserscanning (Fritsch)	1/1/0/0
Topology and Optimisation (Becker)	1/1/0/0
Web-based GIS (Walter)	1/1/0/0

Master Course GEOENGINE

Airborne Data Acquisition (Fritsch, Cramer)	2/1/0/0
Geoinformatics (Fritsch, Walter)	2/1/0/0
Signal Processing (Fritsch)	2/1/0/0
Topology and Optimisation (Fritsch)	2/1/0/0
Integrated Fieldworks (Fritsch, Sneeuw, Keller, Kleusberg)	0/0/4/0

Master Courses „Infrastructure Planning“

Introduction to GIS (Walter)	2/0/0/0
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Diplomstudiengang Luft- und Raumfahrttechnik

Image Processing (Haala)	2/1/0/0
Introduction into projective Geometry (Cramer)	2/0/0/0

