Oblique Aerial Camera Systems for Mapping Purposes

Instructors:

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Target audience: University and PhD students in fields related to geomatics; staff from National Mapping Agencies, public authorities and interested third parties involved with aerial data collection and processing.
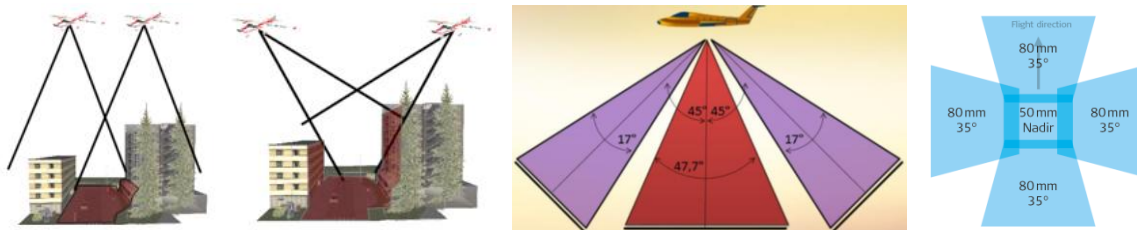
Introduction: Oblique airborne photogrammetry is rapidly maturing and being offered by service providers as a good alternative or replacement of the more traditional vertical imagery and for very different applications. Nowadays many companies and most of the European National Mapping Agencies (NMAs) still rely on the traditional workflow based on vertical photography but changes are slowly taking place also at production level. Some data providers have already run some tests internally to understand the potential for their needs whereas others are discussing on the future role of the oblique technology and how to possibly adapt their production pipelines. At the same time, some research institutions and academia demonstrated the potentialities of oblique aerial datasets to generate textured 3D city models or large building block models.

Course objective: The course wants to review all basic principles and applications of oblique imagery, from image formation and acquisition to processing and (3D) content generation. The participants will get insights of oblique aerial photography and mapping, with its largest potential but also actual problems. Exercises with commercial and in-house software will also be executed to investigate image triangulation, dense matching and 3D building generation.

Course outline: The course provides an overview of oblique camera systems, processing methodologies and best practices with also practical works on oblique aerial blocks. The pre-course seminar in TU Braunschweig will introduce, with theoretical aspects and mapping examples, to the basic concepts of oblique aerial photography, image triangulation, dense point cloud generation and 3D building extraction. The e-learning part of the course will involve more theoretical concepts and practical exercises / assignments, including aerial

triangulation of small oblique blocks, dense point cloud generation, Digital Surface Model (DSM) production, feature measurements and extraction for mapping purposes. Support from the instructors will be available through the Internet.

Module 1. Principles of oblique aerial photography, commercial cameras and systems

The module introduces the participant to the basic concepts of oblique aerial cameras, analyzing existing systems, applications, advantages, disadvantages and open issues.
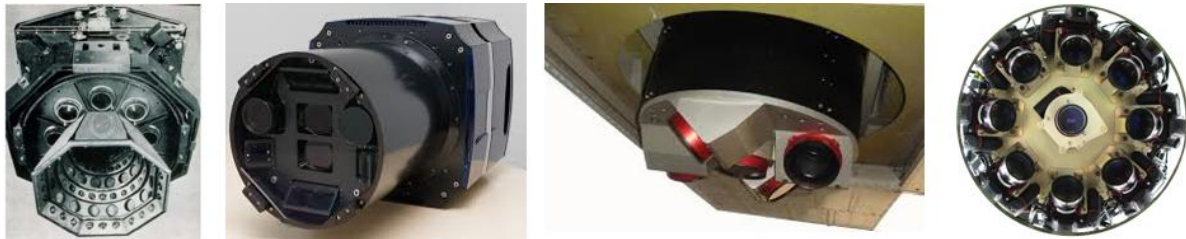
Module 2. Photogrammetric processing

The module focuses on the theoretical and practical photogrammetric processing of oblique aerial blocks. Advanced tie point extraction solutions, bundle block adjustment, pixel-based dense image matching, DSM and orthoimage generation and quality control will be reviewed and tested.
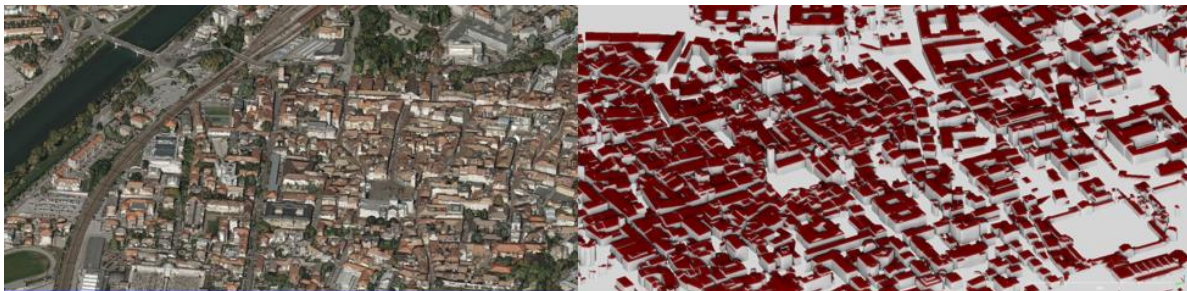
Module 3. Feature extraction

The module will present the additional processing achievable with oblique imagery and related products. Interactive feature extraction and possible 3D building modeling will be tested, analyzed and discussed.