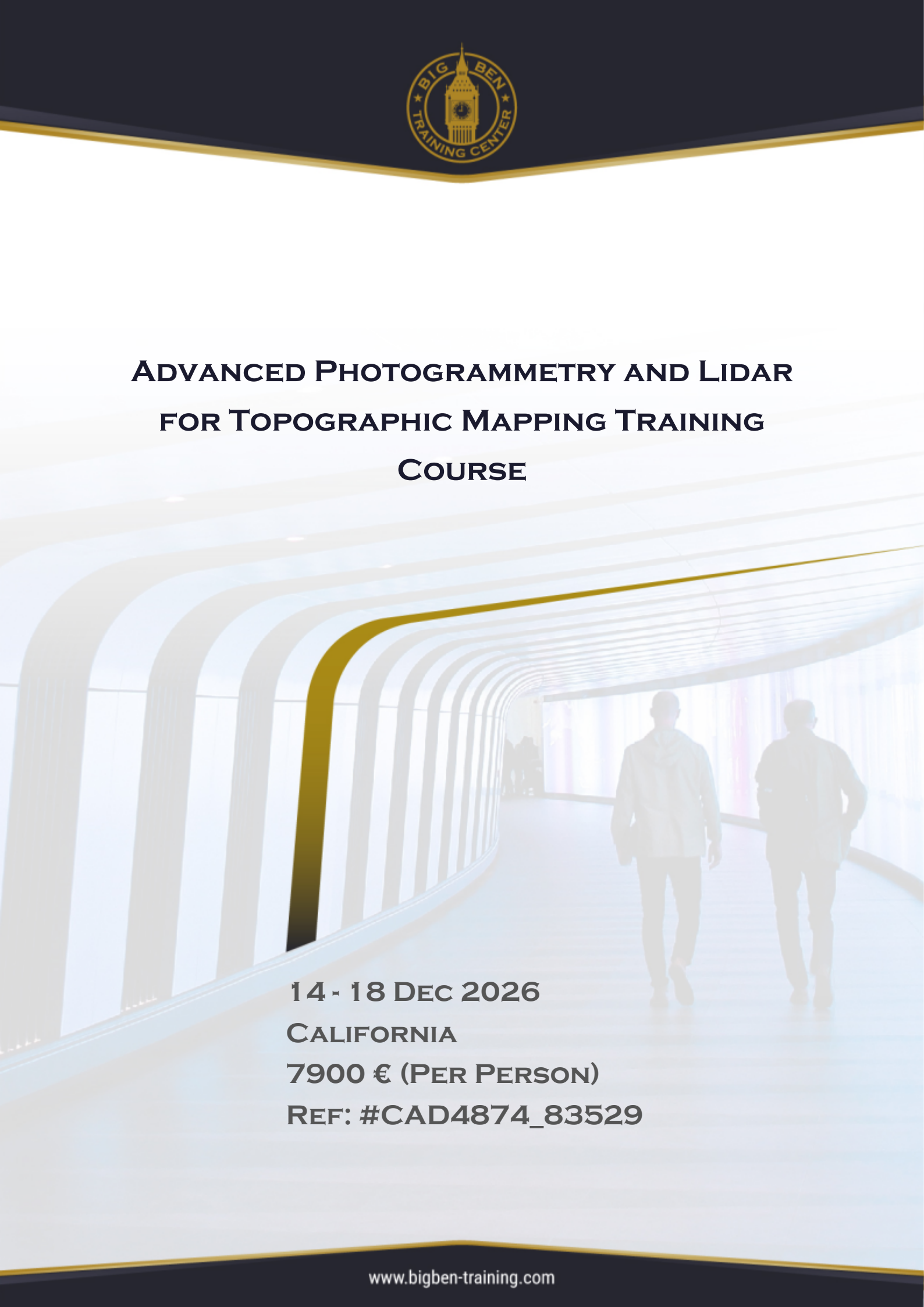
Advanced Photogrammetry and Lidar for Topographic Mapping Training Course



14 - 18 Dec 2026

California

7900 € (Per Person)

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Course Introduction / Overview:

This comprehensive training course provides an in-depth exploration of two of the most powerful remote sensing technologies in modern geospatial science: photogrammetry and Lidar. In an era where high-accuracy 3D data is critical for countless applications, mastering these techniques is essential for professional advancement. The curriculum is designed to bridge the gap between theoretical principles and practical application, ensuring participants can confidently manage projects from data acquisition to final product delivery. Drawing upon foundational concepts detailed in works like "Elements of Photogrammetry with Application in GIS" by Paul R. Wolf and Bon A. DeWitt, the course delves into the entire workflow. Participants will learn the nuances of both aerial and terrestrial data capture, point cloud processing, and the creation of detailed topographic maps and 3D models. BIG BEN Training Center has developed this program to equip professionals with the skills to leverage the synergy between photogrammetry and Lidar, enabling them to tackle complex mapping challenges with precision and efficiency. This course is not just about learning software; it is about understanding the science behind the data to make informed decisions and produce reliable geospatial intelligence.

Target Audience / This training course is suitable for:

- Surveyors and Geomatics Engineers.
- GIS Analysts and Specialists.
- Civil and Environmental Engineers.
- Urban and Regional Planners.
- Geologists and Earth Scientists.
- Archaeologists and Heritage Managers.
- Construction Project Managers.
- Remote Sensing Technicians.
- Asset and Infrastructure Managers.

Target Sectors and Industries:

- Civil Engineering and Construction.
- Mining, Quarrying, and Natural Resource Extraction.
- Oil and Gas Exploration and Production.
- Environmental Consulting and Management.
- Urban Planning and Smart City Development.
- Agriculture and Forestry Management.
- Government agencies, including land survey departments and transportation authorities.
- Telecommunications and Utilities.
- Archaeology and Cultural Heritage Preservation.

Target Organizations Departments:

- Surveying and Geomatics.
- Engineering and Design.
- Geographic Information Systems (GIS).
- Planning and Development.
- Environmental Compliance and Monitoring.
- Research and Development (R&D).
- Asset Management and Operations.
- Infrastructure and Public Works.

Course Offerings:

By the end of this course, the participants will have able to:

- Master the fundamental principles of photogrammetry and Lidar technology.
- Plan and execute data acquisition missions using UAVs and terrestrial scanners.
- Process raw sensor data into clean, usable point clouds and 3D meshes.
- Perform advanced point cloud classification, filtering, and registration.
- Generate high-accuracy Digital Elevation Models (DEM), Digital Terrain Models (DTM), and Digital Surface Models (DSM).
- Extract meaningful features and measurements from 3D geospatial data.
- Integrate photogrammetric and Lidar datasets for comprehensive analysis.
- Apply quality assurance and quality control (QA/QC) protocols to mapping projects.
- Utilize processed data within standard GIS and CAD software environments.
- Develop efficient workflows for various topographic mapping applications.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, practical, and highly interactive, ensuring participants gain tangible skills. This course moves beyond traditional lectures by integrating hands-on software exercises that simulate real-world project workflows. Each theoretical module is immediately followed by practical application, allowing participants to work with sample photogrammetry and Lidar datasets. The instructor will guide attendees through complex data processing tasks, from initial point cloud cleaning to final topographic map creation. A significant portion of the course is dedicated to case study analysis, where participants will examine successful mapping projects from industries like civil engineering, environmental monitoring, and urban planning. Collaborative group discussions and problem-solving sessions are encouraged, fostering a dynamic learning environment where participants can share experiences and learn from one another. Continuous feedback is provided by the instructor to ensure concepts are thoroughly understood and skills are correctly applied, preparing participants to confidently implement these technologies in their own professional work.

Course Agenda (Course Units):

Unit One: Fundamentals of Geospatial Data Acquisition

- Introduction to Photogrammetry and Remote Sensing.
- The Physics of Light and Lidar Technology.
- Comparison of Active vs. Passive Sensing Systems.
- Types of Platforms: Aerial (UAV, Manned Aircraft) and Terrestrial.
- Understanding Coordinate Systems, Projections, and Datums.
- Principles of Georeferencing and Ground Control Points (GCPs).
- Safety Protocols and Regulations for Data Acquisition.

Unit Two: Photogrammetric Mapping Workflow

- Principles of Stereoscopy and Structure from Motion (SfM).
- Planning a UAV Photogrammetry Mission.
- Camera Calibration and Image Quality Assessment.
- Processing Aerial Imagery to Generate Point Clouds.
- Creating Orthomosaics and 3D Textured Meshes.
- Techniques for Data Accuracy Assessment.
- Applications in Volume Calculation and Site Monitoring.

Unit Three: Lidar Technology and Point Cloud Processing

- Fundamentals of Airborne and Terrestrial Lidar Systems.
- Understanding Lidar Data Attributes (Intensity, Return Number).
- Initial Processing of Raw Lidar Data (LAS/LAZ formats).
- Point Cloud Noise Filtering and Outlier Removal.
- Methods for Point Cloud Registration and Alignment.
- Introduction to Point Cloud Classification Algorithms.
- Data Tiling and Management Strategies for Large Datasets.

Unit Four: Advanced Data Analysis and Feature Extraction

- Automated and Manual Ground Classification Techniques.
- Creating Digital Elevation Models (DEM), DTM, and DSM.
- Generating Contours and Slope Maps from Elevation Data.
- Extracting Building Footprints and Vegetation Canopies.
- 3D Modeling of Infrastructure and Natural Features.
- Change Detection using Multi-Temporal Datasets.
- Quality Assurance and Control (QA/QC) for Lidar Deliverables.

Unit Five: Data Integration and Project Applications

- Synergies of Fusing Photogrammetry and Lidar Data.
- Integrating 3D Data into GIS and CAD Environments.
- Case Study: Topographic Mapping for a Civil Engineering Project.
- Case Study: Forest Inventory and Canopy Analysis.
- Case Study: Urban Infrastructure and Asset Management.
- Developing a Project Plan from Scoping to Delivery.
- Future Trends in 3D Mapping Technology.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As autonomous data acquisition platforms become more prevalent, how might the roles of photogrammetrists and Lidar specialists evolve from data collectors to data curators and analysts?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering a unified, holistic curriculum that treats photogrammetry and Lidar not as separate disciplines, but as complementary technologies within a single, integrated workflow. Unlike many programs that focus on one technology or the other, we emphasize the synergy between them, teaching participants how to leverage the strengths of each the rich texture from photogrammetry and the ground-penetrating precision of Lidar to create superior geospatial products. The focus is placed squarely on practical application and problem-solving rather than abstract theory or mastery of a single software package. We utilize a variety of real-world case studies that reflect current industry challenges, from complex urban environments to dense vegetation, ensuring the skills learned are immediately applicable. The curriculum is designed to build critical thinking, enabling participants to select the right technology for a given project, design an efficient workflow, and rigorously assess the quality of their results. This approach cultivates not just technicians, but well-rounded geospatial professionals capable of managing complex mapping projects from conception to completion with confidence and expertise.