UAV-Based Lidar Systems and Data Fusion Training Course

Professional Development Training Course Outline

Category	GIS	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

UAV-Based Lidar Systems and Data Fusion Training Course offers an immersive experience into the cutting-edge world of **UAV-based LiDAR systems** and **data fusion techniques**. As industries rapidly adopt drone technology for **precision mapping**, **3D modeling**, and **remote sensing**, the demand for skilled professionals capable of acquiring, processing, and interpreting high-accuracy LiDAR data is skyrocketing. This program empowers participants with the practical expertise to leverage these advanced geospatial tools, enabling efficient and accurate data collection for diverse applications, from **urban planning** to **environmental monitoring**.

Participants will gain a deep understanding of LiDAR principles, **drone operations**, and the intricacies of **data integration** from multiple sensors. The course emphasizes **hands-on experience** with industry-standard software and hardware, ensuring graduates are well-equipped to tackle real-world challenges. By mastering **data fusion**, participants will unlock enhanced insights, improve data reliability, and contribute to more informed decision-making across various sectors. This training is essential for anyone looking to excel in the evolving landscape of **geospatial intelligence** and **drone technology**.

Programme Curriculum

UAV-Based Lidar Systems and Data Fusion Training Course

Introduction

UAV-Based Lidar Systems and Data Fusion Training Course offers an immersive experience into the cutting-edge world of **UAV-based LiDAR systems** and **data fusion techniques**. As industries rapidly adopt drone technology for **precision mapping**, **3D modeling**, and **remote sensing**, the demand for skilled professionals capable of acquiring, processing, and interpreting high-accuracy LiDAR data is skyrocketing. This program empowers participants with the practical expertise to

leverage these advanced geospatial tools, enabling efficient and accurate data collection for diverse applications, from **urban planning** to **environmental monitoring**.

Participants will gain a deep understanding of LiDAR principles, **drone operations**, and the intricacies of **data integration** from multiple sensors. The course emphasizes **hands-on experience** with industry-standard software and hardware, ensuring graduates are well-equipped to tackle real-world challenges. By mastering **data fusion**, participants will unlock enhanced insights, improve data reliability, and contribute to more informed decision-making across various sectors. This training is essential for anyone looking to excel in the evolving landscape of **geospatial intelligence** and **drone technology**.

Course Duration

5 days

Course Objectives

Upon completion of this course, participants will be able to:

1. Operate various UAV LiDAR platforms for effective data acquisition in diverse environments.
2. Understand the fundamental principles of Light Detection and Ranging (LiDAR) technology.
3. Execute safe and compliant drone operations according to current regulations.
4. Plan and optimize UAV flight missions for optimal LiDAR data collection and coverage.
5. Perform LiDAR point cloud processing including classification, filtering, and georeferencing.
6. Master data fusion techniques combining LiDAR with photogrammetry and other sensor data.
7. Generate high-resolution 3D models, Digital Elevation Models (DEMs), and Digital Surface Models (DSMs).
8. Utilize geospatial software for advanced analysis and visualization of fused datasets.
9. Assess and ensure data accuracy and quality control in UAV LiDAR projects.
10. Apply UAV LiDAR and data fusion for precision agriculture, infrastructure inspection, and forestry management.
11. Troubleshoot common issues in LiDAR data acquisition and post-processing workflows.
12. Implement best practices for UAV data management and storage.
13. Develop comprehensive UAV LiDAR project workflows from planning to final deliverables.

Organizational Benefits

- Achieve superior precision in mapping and surveying, leading to more reliable insights and decision-making.
- Significantly reduce data collection time and costs compared to traditional methods, improving project turnaround.
- Minimize human exposure to hazardous or inaccessible areas by utilizing drones for data acquisition.
- Stay at the forefront of technological advancements, offering cutting-edge solutions to clients and stakeholders.
- Gain detailed insights into assets, infrastructure, and natural resources for better planning and maintenance.
- Accurately identify and assess potential hazards in construction, mining, and environmental monitoring.
- Empower teams with high-quality, actionable geospatial intelligence for more informed strategic choices.

Target Audience

1. Surveyors and Mappers.
2. GIS and Remote Sensing Specialists.
3. Civil Engineers and Construction Professionals.
4. Environmental Scientists and Conservationists.
5. Forestry and Agriculture Managers.
6. UAV Pilots and Operators.
7. Urban Planners and Developers.
8. Mining and Quarrying Professionals.

Course Outline

Module 1: Introduction to UAV LiDAR Systems

- Understanding LiDAR Fundamentals
- UAV Platforms for LiDAR
- Applications of UAV LiDAR
- Regulatory Frameworks
- **Case Study:** Analyzing a successful UAV LiDAR project for **topographic mapping** of a challenging mountainous terrain, highlighting system selection and flight planning.

Module 2: UAV Flight Planning and Data Acquisition

- Mission Planning Software
- Flight Parameters Optimization
- Ground Control Points (GCPs) and Checkpoints
- Field Data Collection Best Practices
- **Case Study:** Demonstrating efficient data acquisition for a large-scale **pipeline inspection** project, emphasizing route planning and real-time monitoring.

Module 3: LiDAR Point Cloud Processing (Part 1)

- Introduction to Point Cloud Data.
- Data Import and Pre-processing
- Point Cloud Classification
- Filtering Techniques.
- **Case Study:** Processing LiDAR data for a **forest inventory** project, showcasing classification of different tree species and canopy penetration.

Module 4: LiDAR Point Cloud Processing (Part 2)

- Digital Elevation Models (DEM) and Digital Surface Models (DSM) Generation.
- Contour Generation and Volumetric Calculations
- Accuracy Assessment and Validation
- Feature Extraction
- **Case Study:** Calculating **stockpile volumes** at a mining site using UAV LiDAR data, demonstrating efficiency gains over traditional methods.

Module 5: Data Fusion Principles and Techniques

- Multi-Sensor Data Integration.
- Georeferencing and Alignment
- Image-to-LiDAR Co-registration.

- Benefits of Data Fusion.
- **Case Study:** Fusing LiDAR and RGB imagery for detailed **urban planning**, enabling realistic 3D city models and precise infrastructure mapping.

Module 6: Advanced Data Fusion Applications

- Deep Learning for Data Fusion
- Change Detection using Multi-temporal Data
- Vegetation Analysis.
- Building Information Modeling (BIM) Integration
- **Case Study:** Applying data fusion for **post-disaster assessment**, quickly mapping damage and identifying critical infrastructure needs.

Module 7: Geospatial Software for Analysis & Visualization

- Industry-Standard Software Workflows
- Point Cloud Visualization
- Spatial Analysis Tools
- Map and Report Generation
- **Case Study:** Generating high-quality deliverables for a **hydrographic survey**, including bathymetric maps derived from fused LiDAR and sonar data.

Module 8: Project Management and Future Trends

- UAV LiDAR Project Planning
- Data Management and Archiving
- Legal and Ethical Considerations
- Emerging Technologies.
- **Case Study:** Presenting a complete end-to-end **infrastructure monitoring** project, from client requirements to final data delivery and reporting.

Training Methodology

- Interactive Lectures: Concise presentations of theoretical concepts, reinforced with visual aids and real-world examples.
- Hands-on Software Workshops
- Practical Drone Flight Simulations & Exercises
- Case Study Analysis.
- Group Discussions and Q&A Sessions
- Individual and Group Assignments.
- Expert Demonstrations

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com