IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 8, May 2025
Impact Factor: 7.67

Geospatial Survey and Mapping Using DGPS and Drone Technology

Mr. K. Yellaraju[1], Mr. P. Raghupathi[2], CH. Niharika[3], MD. Ubaiduddin[4], D. Narender[5]
Christu Jyothi Institute of Technology and Science, Jangaon, Telangana, India[1-5]
Jawaharlal nehru Technological University of Hyderabad Telangana

Abstract: *This study integrated Differential Global Positioning System (DGPS) and drone-based photogrammetry to conduct a high-precision geospatial survey of the 32-acre Christu Jyothi Institute of Technology & Science (CJITS) campus in Jangaon, Telangana. Using G30 GINTEC DGPS and a DJI Mavic 3 Enterprise drone, the project mapped terrain, infrastructure, and natural features with centimeter-level accuracy. Aerial imagery, captured at 60 meters with 70% overlap, was processed in Agisoft Metashape to produce orthomosaics, Digital Surface Models (DSMs), Digital Terrain Models (DTMs), contour maps, and watershed visualizations. AutoCAD Civil 3D and ArcMap analyses generated spatial datasets, including elevation (361.147–365.607 m), slope (0.01–871.39%), and a detailed building inventory (e.g., Administrative Main Block: 3,707.08 m²). The results demonstrate the efficacy of combined geospatial technologies for institutional mapping, offering scalable solutions for campus management, infrastructure planning ,urban planning, and environmental sustainability. Geospatial survey and mapping have evolved significantly with the integration of advanced technologies such as Differential Global Positioning System (DGPS) and Unmanned Aerial Vehicles (UAVs), commonly known as drones. These technologies offer a highly efficient, accurate, and cost-effective approach for collecting and analyzing spatial data over large and inaccessible areas.*

DGPS enhances the accuracy of conventional GPS by using a network of fixed ground-based reference stations, providing centimeter-level precision, which is crucial for detailed topographic and cadastral mapping. When integrated with drone technology, the capabilities of geospatial surveys are vastly improved. Drones equipped with high-resolution cameras, LiDAR, and thermal sensors can capture real-time aerial imagery and data, which is processed using photogrammetry and GIS software to create detailed 2D maps, 3D models, Digital Elevation Models (DEMs), and orthomosaics.

This combination is particularly beneficial for applications in civil engineering, urban planning, agriculture, disaster management, and environmental monitoring. The use of DGPS ensures the positional accuracy of drone-captured data, making it suitable for precise engineering and planning tasks. Overall, the synergy between DGPS and drone technology is transforming traditional surveying methods,.

Keywords: CJITS College

DOI: 10.48175/568