OPEN ACCESS Freely available online

ISSN: 2469-4134
Journal of Remote Sensing & GIS

Perspective

Photogrammetry in Remote Sensing and Geospatial Sciences

Matteo Krzysztof*

Department of Geomatics, Forest Research Institute (IBL), Raszyn, Poland

DESCRIPTION

Photogrammetry is the science and technology of obtaining reliable measurements, spatial information, and three-dimensional representations of objects and terrain from photographs and digital imagery. As a fundamental discipline within remote sensing and geospatial sciences, photogrammetry has evolved significantly with advancements in digital imaging, computer vision, Unmanned Aerial Vehicles (UAVs), and Geographic Information Systems (GIS). Today, photogrammetry plays a vital role in mapping, surveying, environmental monitoring, urban planning, engineering, archaeology, and disaster management by providing accurate and cost-effective geospatial data.

The principle of photogrammetry is based on extracting geometric information from overlapping images captured from different viewpoints. By analyzing the position, orientation, and relationships between corresponding points in multiple images, photogrammetric techniques can determine the precise location, shape, and dimensions of objects on the Earth's surface. This capability enables the creation of detailed maps, Digital Elevation Models (DEMs), orthophotos, and three-dimensional models that support various scientific and practical applications.

Photogrammetry can be broadly classified into terrestrial photogrammetry, aerial photogrammetry, and satellite photogrammetry. Terrestrial photogrammetry involves capturing images from ground-based platforms and is commonly used in engineering, architecture, and cultural heritage documentation. Aerial photogrammetry utilizes images acquired from aircraft or UAVs to generate high-resolution spatial datasets for mapping and land surveying. Satellite photogrammetry employs imagery collected by Earth observation satellites to produce large-scale topographic and thematic maps, particularly for regional and global studies.

One of the most significant applications of photogrammetry is topographic mapping. Accurate maps are essential for infrastructure development, land administration, transportation planning, and resource management. Through stereoscopic analysis of overlapping aerial photographs or satellite images, photogrammetrists can derive elevation information and generate detailed terrain models. These products provide valuable insights into landscape characteristics and support effective planning and decision-making processes.

The integration of photogrammetry with GIS has enhanced the efficiency and accuracy of spatial data management. Photogrammetrically derived datasets can be incorporated into GIS environments for spatial analysis, visualization, and decision support. This integration enables users to combine imagery-based information with other geographic datasets, facilitating comprehensive assessments of environmental, social, and economic conditions. Such capabilities are particularly valuable in urban planning, where accurate spatial information is required for infrastructure design and sustainable development initiatives.

Environmental monitoring represents another important application area of photogrammetry. High-resolution aerial and satellite imagery can be used to monitor land-use changes, deforestation, coastal erosion, habitat degradation, and other environmental phenomena. By comparing images acquired at different times, researchers can identify changes in landscapes and assess the impacts of human activities and natural processes. These analyses support conservation efforts and contribute to sustainable natural resource management.

In conclusion, photogrammetry has become an indispensable tool in remote sensing and geospatial sciences, providing accurate spatial information for a wide range of applications. Its ability to generate detailed maps, terrain models, and three-dimensional representations supports environmental monitoring, urban planning, engineering, disaster management, and resource assessment. With continuous advancements in imaging technologies, UAV systems, and automated processing techniques, photogrammetry will continue to play a central role in the acquisition and analysis of geospatial information, contributing significantly to scientific research and sustainable development.

Correspondence to: Matteo Krzysztof, Department of Geomatics, Forest Research Institute (IBL), Raszyn, Poland, E-mail: matteo@krzysztof.pl

Received: 27-Feb-2026, Manuscript No. JGRS-26-31719; **Editor assigned:** 02-Mar-2026, PreQC No. JGRS-26-31719 (PQ); **Reviewed:** 16-Mar-2026, QC No. JGRS-26-31719; **Revised:** 23-Mar-2026, Manuscript No. JGRS-26-31719 (R); **Published:** 30-Mar-2026, DOI: 10.35248/2469-4134.26.15.413

Citation: Krzysztof M (2026). Photogrammetry in Remote Sensing and Geospatial Sciences. J Remote Sens GIS. 15: 413.