Enhancing Land Tenure Systems in Small Island Developing States (SIDS) through UAV-Based Cadastral Mapping Innovations

Alvin Clarke (USA)

Key words: Cadastre; Informal settlements; Land management; Keyword 1; Keyword 2; Keyword 3

SUMMARY

Land tenure security is a cornerstone of sustainable development, economic stability, and social equity, yet many Small Island Developing States (SIDS) continue to grapple with limited cadastral systems that hinder economic development. In Jamaica currently 60% of lands have a registered title, while the remaining 40% are unregistered lands and lack formal documentation.

This Paper examines the potential of Unmanned Aerial Vehicles (UAVs) to augment cadastral mapping and strengthen land tenure systems in SIDS, focusing on Jamaica. Drawing on a mixed-methods approach integrating spatial analysis, institutional review, and cost–benefit evaluation, the study explores the operational, legal, and socioeconomic implications of integrating UAV-based mapping into national cadastral workflows.

The research is grounded in geospatial data theory, Land Surveyors Act of Jamaica while employing the principles of remote sensing and photogrammetry to analyze UAV-acquired datasets. The findings demonstrate that UAVs significantly enhance mapping efficiency and accuracy, particularly in informal or unregistered communities where traditional survey methods are slow or prohibitively expensive. Beyond the technical dimension, the paper evaluates the policy, legal, and social frameworks that govern cadastral modernization, assessing how UAV technologies can bridge existing gaps in tenure regularization and poverty reduction.

Jamaica is currently developing standards for UAV operations for aerial surveying, further integration into the Land Surveyors Act of Jamaica will require varying levels of readiness based on institutional capacity for certification and technological investment. The comparative results show

---

that UAV-driven cadastre implementation can reduce field time by up to 60% and drastically enhance transparency in land records.

The study concludes with policy recommendations for harmonizing UAV operations with national geospatial infrastructures, emphasizing participatory approaches, open-data standards, and legal reforms. These findings contribute to global efforts under the UN's Sustainable Development Goals (SDGs 1, 9, and 11) to promote inclusive land governance and resilient geospatial ecosystems in SIDS.

Keywords: UAVs, cadastral mapping, land tenure security, SIDS, Jamaica, geospatial technology, land administration