SaaS and Web Editing for Fit For Purpose Land Administration

Matthew Keeling (USA), Katie Pickett and Matthew Woodlief (USA)

Key words: Cadastre; e-Governance; Geoinformation/GI; Land management; Professional practice; Security of tenure; Standards

SUMMARY

Governments around the world are turning to 3D applications to better understand their built environment, plan for future developments, and create equitable tax collection processes. In the age of the 3D application the terms 3D model, digital twin, and 3D cadastre are used interchangeably. These terms come with their own definitions and purpose served, specifically when it comes to the data and technology required and the legal structure of implementing such a system. ☐☐The 3D model is the most simple and accessible. It provides a 3D view of a given area and is used strictly for viewing data in three dimensions. 3D models can be powerful tools for urban planning and design. Some specialized data types such as LiDAR point clouds or true ortho photos flown with the correct obliquity and overlap and technology—a modern GIS or 3D viewer are required to implement. ☐☐The digital twin is much more robust and shows the interactivity between various infrastructure and natural systems, such as the growth potential of green spaces based on the number of hours of direct sunlight, flood water controls during storm events, and traffic patterns during inclement weather. With the digital twin, it is possible to start simulating natural phenomenon and the impact these events have on infrastructure. Data in a geographic information system (GIS) ready format as well as leveraging a modern GIS platform is essential for a successful digital twin implementation. ☐☐The 3D cadastre is the most complex of the three explored in this paper and should require legal standing to implement. The complexity of a 3D cadastre derives from the requirement to model the rights, restrictions, and responsibilities of a given land parcel. It is also the most data intensive as accurate parcel boundaries and property values are required to execute properly. Due to data sensitivity, the governing body needs to have a legal standing to collect, process, store, and disseminate this information. ☐☐While 3D models, digital twins, and 3D cadastres use similar technology and require similar data, they are built for different purposes. Simple 3D models are built for visualization, while the purpose of the 3D cadastre is to keep track of existing land record information as it exists now and in the past. A digital twin is used to model

SaaS and Web Editing for Fit For Purpose Land Administration (13552)
Matthew Keeling (USA), Katie Pickett and Matthew Woodlief (USA)

FIG Working Week 2025
Collaboration, Innovation and Resilience: Championing a Digital Generation
Brisbane, Australia, 6–10 April 2025

future scenarios or current problems where authoritative data has not yet been created. ☐☐Although they might look similar, the technologies most appropriate for digital twins and 3D models and cadastres are different, as visualization, modeling different scenarios within the existing or future built environment and tracking land records in three dimensions are fundamentally different processes. GIS are the most appropriate tool in each of these cases, but the specifics of how to implement each have significant differences. This paper will further elucidate the differences between a 3D model, digital twin, and 3D cadastre by providing comparisons with real world scenarios where each would be the best fit, requirements for data and technology, and best practices learned from real implementations.