Digital Elevation Model for 3D Cadastre Visualization in WebGIS Bhumi: Jakarta case study

Mulyadi Mulyadi, Akhmad Faizal, I Ketut Gede Ary Sucaya, Virgo Eresta Jaya and Kariyono Kariyono (Indonesia)

Key words: Cadastre; Digital cadastre; Geoinformation/GI; 3D Cadastre; 3D Visualization; Web GIS; Cesium, digital elevation model; Indonesia

SUMMARY

Altitude is an important aspect in cadastral 3D data visualization. The research at Pusdatin building of the Ministry of Agrarian Affairs (ATR) shows that the use of a digital elevation model from Lidar measurements presented in Cesium Terrain format can represent more accurate topographical conditions in the 3D data visualization of the building in WebGIS Bhumi. Accurate topographical conditions are important considering that the legal space for 3D data can be above or below ground level (Government Regulation No. 18/2021). Spatial information presented on WebGIS Bhumi will be consumed by the public so that the data presented should not cause public confusion, including in cadastral 3D data visualization. The legal space above the ground may have different legal treatment from the legal space below the ground. However, after other 3D data such as the MRT station in Blok M and the HI roundabout Jakarta is displayed in Bhumi's WebGIS, the data is not correct on the terrain surface. This could be due to the height difference between the terrain surface and the ground zero used in the 3D model. In addition, the terrain conditions presented by Cesium Terrain by default in the area around the HI roundabout are uneven even though the area should be flat considering the HI roundabout is in an urban area. This can be corrected by changing the default terrain provided by Cesium with a more accurate digital elevation model. An accurate digital elevation model can be obtained from the results of Lidar measurements, but the procurement of a Lidar DEM is expensive, so it may need to be done in stages. The most accurate digital elevation model currently available in Indonesia is DEMNAS. In this paper, DEMNAS data will be tried to be converted to the Cesium Terrain format which is then presented on WebGIS Bhumi. This project aims to provide more accurate topographical conditions in presenting cadastral 3D data on WebGIS Bhumi. This project will also produce a DEMNAS topographic surface service in Cesium Terrain format which can be used in 3D WebGIS development using Cesium. This terrain service can also be equipped with DEM data that is more thorough in stages such as DEM from Lidar measurements.