

**Utilizing GIS for effective datamodel design at the NWU  
Potchefstroom Campus**

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## ABSTRACT

Record keeping and management of electrical utilities inside buildings is an important aspect to ensure effective electrical distribution. The ability to find the location of each electrical feature inside a building and extract information about it helps to solve network problems faster. The use of a spatial database structure facilitates the maintenance and general operations of an electrical network across different buildings.

The aim of this study is to design and develop a 3D data model to provide a management system for electrical utilities inside buildings. The geodatabase provides integrated information between different electrical components forming the network inside the specified buildings in the study area.

A prototype called the PUK geodatabase was designed and developed for the NWU Potchefstroom Campus as a 3D data model. The data model consists of raster and vector data used in network datasets, relationship classes and topology rules. The aim of this project was accomplished through the 3D analysis capabilities of the model. The research determined that the prototype called the PUK geodatabase can be utilized as a 3D management system for electrical utilities across the different floor levels of a building.

*Keywords:* 3D data model design, geodatabase design, electrical infrastructure management, network analysis, Potchefstroom campus.

## OPSOMMING

Rekordhouding en bestuur van elektriese toebehore en infrastruktuur binne geboue speel 'n belangrike rol om die effektiewe verspreiding van elektrisiteit te verseker. Die vermoë om die posisie van elke elektriese toestel binne 'n gebou te bepaal en inligting daarvoor te onttrek help om netwerk probleme vinniger op te los. Die gebruik van 'n ruimtelike databasis struktuur fasiliteer die instandhouding en algemene bedrywigheide van 'n elektriese netwerk regoor verskillende geboue.

Die doel van hierdie studie is om 'n 3D data model te ontwerp en te ontwikkel om sodoende 'n bestuurstelsel vir elektriese toebehore binne geboue te verskaf. Die geografiese databasis verskaf geïntegreerde inligting van verskillende elektriese komponente wat die netwerk binne die gespesifiseerde geboue in die studie-area vorm.

Die prototipe bekend as die PUK geografiese databasis was ontwerp en ontwikkel as 'n 3D data model wat uit rooster en vektor data bestaan. Hierdie data word gebruik in netwerk datastelle, verhoudings en topologieë. Die doel van hierdie projek was bereik as gevolg van die model se vermoë om 3D analises te doen. Die navorsing het bepaal dat die prototipe bekend as die PUK geografiese databasis gebruik kan word as 'n 3D bestuurstelsel vir elektriese toebehore regoor die verskillende vloer vlakke van 'n gebou.

*Slutelwoorde:* 3D data model ontwerp, geografiese databasis ontwerp, elektriese infrastruktuur bestuur, netwerk analise, Potchefstroom kampus.

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