

Abstract

24th IERE General Meeting and PLN Indonesia Forum
November 19–22, 2024

Enhancing 20 kV Distribution Network Inspections with Augmented Reality: A Cost-Effective Solution for Asset Management and Digital Transformation

Very Fernando

Officer Application of Distribution, Departement of Technology Information, PT PLN
(Persero)
Jakarta, Indonesia

Keywords: *Augmented Reality, Asset Management, 20 kV Distribution, Digital Transformation, Real-Time Data*

Abstract

The increasing need for efficient asset management within PLN's 20 kV distribution network has driven the exploration of augmented reality (AR) technology to enhance asset inspections. Manual inspections often result in data inconsistencies, slow decision-making, and high operational costs. This study focuses on using AR integrated with Geographic Information Systems (GIS) to address these challenges by providing real-time asset data visualization for field technicians and management.

The research was conducted at PLN Manado, covering 0.5 million customers, 3146 km of MV lines, and 4541 substations, over a geographical area of 200-250 square kilometers. AR was tested to overlay critical asset information such as installation year, operational status, and health metrics, allowing field technicians to view this data without direct communication with operations centers. The project also explored the integration of AR with IBM Maximo and Digital Twins for continuous network monitoring.

Initial results indicated that while AR setup is 23% more expensive than manual inspections, the break-even point is achieved at 600 km of inspections within six months, making AR more cost-effective in the long run due to reduced recurring costs like printing. Future research will focus on expanding AR capabilities to include underground asset inspections and integrate disaster data for enhanced asset vulnerability assessment.