

**DEVELOPING AND TESTING A METHOD TO MAP  
UNDERGROUND UTILITY NETWORKS  
CASE STUDY – ELECTRICITY DISTRIBUTION NETWORK OF  
UNIVERSITY OF PERADENIYA**

**N. M. P. Gunawardana**

Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

Present days, utility networks are used to supply some of human needs in the form of commodities. The best examples are water, electricity, telecommunication and in some countries fuel like gas. With the rapid urbanization and due to safety issues, most of these utilities are transported to households by means of underground supply networks.

In order to perform the key operations like design, maintain, replace, enhance and expand, a systematically developed location and attribute dataset is essential. As the 'location' is the crucial factor, it is understood that the Geoinformatics should be the best solution to develop a geo-spatial dataset. With GIS, Remote Sensing and GNSS technologies, geographical data together with other related data can be collected, stored, managed and manipulated systematically. There are several geomatical and geophysical technologies used around the world like Ground Penetration Radar (GPR), Differential GNSS receivers, very high scale maps, aerial photographs, etc. Even though, most of them can be used to produce highly accurate maps, they tend to be too expensive for some institutes and personnel, especially in a developing country like Sri Lanka. Also some data like high accurate maps might not be available throughout the mapping area.

Already some institutes of the country have started mapping their underground utility networks using different inexpensive techniques. With this project it is expected to try out a combination of such inexpensive technologies and existing data to produce a geo-spatial dataset. As a case study, mapping of the underground electricity supply network of University of Peradeniya has been selected. It is an over 60 years old network, which has not been properly mapped since the installation. Several issues and requirements have arisen in the past couple of months, which highlight the need for proper mapping of the system. Hence a combination of high resolution satellite images, consumer GPS receivers, digital survey maps and handheld cable locators were used to map the underground network. The outcomes of the project were handed over to the main stakeholder, the Maintenance Department of the university and its personnel are expected to use this data. Since they are not GIS experts, some tools had to be developed to ease up the complexity of operation and a simple web-based platform was created to share and publish data with the other interested parties like administration of the university, Ceylon Electricity Board (CEB), etc. Wherever it is possible, free and open-source technologies were used to minimize cost. In the end the usability and the reliability of the system were checked to review the success of the methodology.