

# CISSET

## **USING THE GEOGRAPHIC INFORMATION SYSTEM MERSIN UNIVERSITY'S FIBER OPTIC NETWORK CONSTRUCTION OF INFRASTRUCTURE**

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### **ABSTRACT**

Keeping the infrastructure information in Geographic Information Systems (GIS) environment ensures reliable, systematic and up-to-date data, as well as accurate decision making and results in planning and operation phases. Thanks to these systems, access to infrastructure information that is difficult and costly is ensured in a healthy way. For this purpose, Mersin University fiber optic network infrastructure information system has been established. Thanks to the system, it is ensured that fiber optic network infrastructure networks are kept with a standard and systematic structure and the data is kept up-to-date with the necessary queries and analyzes with the web application.

**Keywords:** *Geographic Information System, Infrastructure Information System, Mersin University*

## 1. INTRODUCTION

Geographic Information Systems (GIS) are the information systems that deal with collecting, storing, displaying up-to-date data belonging to the surface or the subsurface of Earth, also doing, examining, analysing relational modelling between related data with a correct planning method. Geographic Information Systems are also used by Infrastructure Information Systems (IIS). A lot of information about Internet, natural gas, electric networks and water pipelines are reachable by using GIS and this provides examining, analysing and doing relational modelling quickly. By this way, expenses can be reduced and it helps to establish infrastructure systems in a short while and in a convenient manner (Murat,2010)

In Turkey, the infrastructure networks has been managed by classical methods in recent years, however it is impossible to manage those networks by classical approaches since the population has increased day by day and the needs of the people has also escalated proportionally regarding the population. Therefore, the solution to those issues is based on establishing Infrastructure Information System in order to solve infrastructure-related problems rapidly and decide what to do in a secure fashion (Yılmaz).

A lot of institutions has already started establishing their own infrastructure information systems i.e Campus Information System of Middle East Technical University (Erk,2011) is one of them in which GIS was used. Moreover, İGDAŞ and İSKİ Infrastructure Information Systems of Istanbul Metropolitan Municipality (Erk,2011) could be counted as some other examples of GIS projects. Besides, Infrastructure Information Systems has become widespread all over Turkey.

When the technology, which is improving really fast, is taken into consideration, the communication of the universities with the world is quite important. Currently, the medium that provides fast communication with the parties is the Internet and fiber networks are the fastest Internet providers of the world. That is why fiber networks are really important. It is really hard to manage Mersin University's fiber optic infrastructure with those classical methods when the importance of the university in Turkey and in the world is considered. For that reason, the fiber optic network infrastructure information system has been established in this study. Thanks to this system, the fiber optic network system was kept in a standardized and systematic format. Moreover, the web application provided an opportunity to query and analyze the data in an up-to-date structure.

In the 2<sup>nd</sup> part of this study, it is mentioned about the fiber optic infrastructure information system of Mersin University and there are some explanations about the method. Apart from that the findings were discussed in the 3<sup>rd</sup> chapter and the results are shown in the last chapter.

## 2. MERSIN UNIVERSITY FIBER OPTIC NETWORK INFRASTRUCTURE INFORMATION SYSTEM (MÜFOAABS)

Mersin University Fiber Optic Network Infrastructure Information System is established through transferring numerical and verbal data to electronic

platforms and associating those data with each other.

The infrastructure data of the fiber optic network infrastructure of Mersin University are currently stored by the staff, who are appointed by the institution, using classical methods. By using MÜFOAABS, the spatial status of the Internet providing fiber optic networks in the Campus like soil type, how many meters below the soil should the wires be buried etc. and attribute information of the fiber optic cables like cable type, calibre, date of manufacture etc. can be stored in the system by the help of GIS map tool. By this way, the main purpose is to use the fiber optic network infrastructure information system of Mersin University optimally.

## 3. THE OPERATIONS AND THE BENEFITS OF MERSIN UNIVERSITY FIBER OPTIC NETWORK INFRASTRUCTURE INFORMATION SYSTEM

### 3.1. Digitization

Before the information systems were established, the plans and the drawings that belonged to fiber optic networks were kept on paper. Those can be transferred to digital environment by the help of GIS technology. Using GIS softwares, the scanned drawings can be coordinated by using desired projection and coordinate system. By this way, the drawings are put into a coordinate system that is acknowledged by the universal authorities. After coordinating phase, the elements on the network plans are transferred into point and line formats. The total sum of all those phases are called as digitization.

After finishing all the digitization process and combining all those, the fiber optic network that belongs to all the Campus would be put and displayed on a computer screen. This gives an opportunity to save tons of paper and carry all the stuff in a small USB device (Yılmaz)



Figure 1. MÜFOAABS System

### 3.2. Database Creation

Currently, solutions are created by keeping numeric and non-numeric data of the fiber optic network of Mersin University on paper. In case of MÜFOAABS, a database containing all fiber optic network information is created. With the creation of this database, inserting new data or updating existing data of the fiber optic network can be done in a regular, fast and secure way. This type of high cost and important network data needs to be stored in a systematic manner.

### 3.3. Associating Graphical Data with Verbal Data

With the help of GIS software graphical data in computers and databases containing network data can be associated. This association can be from graphical data to database or vice versa. This means, an element from graphical data can be viewed in database, as well as an entry in the database can be viewed as graphical data. The process of associating graphical data with verbal data provides a fast way to access data. If there is a problem in any area of the network or in case a maintenance-repair etc. operation is needed, accessing data of network element like calibre, flow, length etc. in a secure and fast way could help to make a healthy and correct decision for solving the problem.

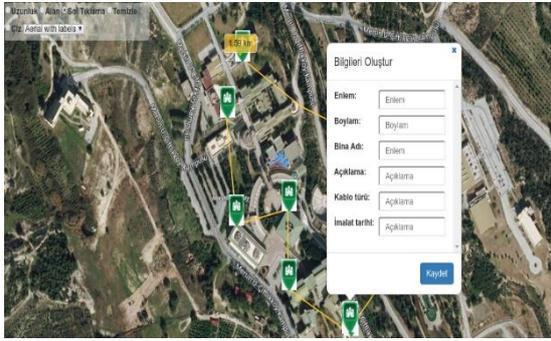


Figure 2. MÜFOAABS Information Entry

## 4. CONCLUSION

Infrastructure information systems created with GIS are time-saving and make efficient and systematic use of financial resources. Since those systems are in a data structure with analysis and querying capabilities, they allow accurate decision-making and planning. Those systems make it possible to do healthy and functional interventions in infrastructure operations. Integrating those systems to some systems in cities allow them to be comfortable, clean and systematic.

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