IDENTIFICATION OF PREFERRED LOCATIONS FOR TELECOMMUNICATION TOWERS FOR AN ANTENNA STRUCTURE FARM NETWORK

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DECLARATION OF THE CANDIDATE

The work described in this thesis was carried out by me under the supervision of Prof. CKM Deheragoda, Department of Geography, University of Sri Jayewardenepura and Mr. HMP Jayantha, Teaching Faculty Member of the M.Sc. Degree in GIS and Remote Sensing, Department of Geography, University of Sri Jayewardenepura and confirm that this has not been submitted in whole or in part to any university or any other institution for another Degree/Diploma.

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We certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University for the purpose of evaluation.

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DEDICATTION

Like a Shadow

Who were always with me

At my sad moments

And

At my happy moments

Who laughed And

Cried with me

A Father like a king

And

A mother like a queen

I dedicate this to them

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LIST OF ACRONYMS

GSM	- Global System for Mobile
MU	-Mobile Unit
RBS	-Radio Base Station
MTSO	-Mobile Telephone Switching Office
PSTN	-Public Switched Telephone Network
MSC	-Mobile Switching Center
TRCSL	-Telecommunications Regulatory Commission of Sri Lanka
MOU	-Minutes of Use
TISP	-Telecommunication Infrastructure Service Provider
TSP	-Telecommunication Service Provider
CAASC	-Civil Aviation Authority of Sri Lanka
UDA	-Urban Development Authority
MOD	-Ministry Of Defense
PS	-Pradheshiya Sabha
ICNIRP	-International Commission on Non Ionizing Radiation Protection
CEA	-Central Environmental Authority
AC	-ACquisition agent
TAC	-Technical Advisory Committee

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ABSTRACT

Mobile telecommunication plays an important role in modern human society. Therefore, it needs a effective tower network to satisfy all the human Mobile telecommunication requirements. Also these tower networks should be established under the rules and a regulation enacted varies authorities. The Telecommunications Regulatory Commission of Sri Lanka (TRCSL) is responsible for creating national policies in mobile telecommunication using all the rules and regulations enacted by various authorities in mobile communication sector. Even though these institutions have been introduced rules and regulations for the safe of public and infrastructure, the most of the Telecommunication Service Providers (TSPs) are violating these policies by giving various reasons to the TRCSL to achieve their personal goals. Because of that, various problems are occurred, such as electromagnetic emission fear among the neighboring people, lightening damage and environment problems. From above mentioned problems the lightening damage directly violated severely by the TSPs. Other problems are directly controlled by the TRCSL or Central Environment Authority or Pradeshiya Saba etc.

Main objective of the research is to select suitable areas for antenna structures that satisfy national policies and using these areas creating antenna structures farm network for the study area (Balangoda DS division) using Geographical Information System (GIS). Also it should be connected to existing tower of the TSPs. To meet the above objectives, technical parameters were fixed using literature review and personal communications, also using semi-structural questioner and spatial analysis process in ArcGIS 10.1 software Model Builder suitable areas and script and model tools which are generated by using pythonWin2.7.2 software for creating Antenna Structure Farm Network. Using design network and existing tower network view sheds were created. Sub urban and urban areas are precisely covered by the design network viewshed rather than existing tower viewshed. Finally combined model tool was created for entire study, which can be reuse by changing the input data.

Chapter 1

INTRODUCTION

1.0 BACKGROUND

Telecommunication has become one of the most important parts of today's human lives. From Alexander Graham bell's simple wire telephone to complex Satellite Telephone, Telecommunication has developed rapidly. The word telecommunication was adapted from French. It is a compound of the Greek prefix tele- (τηλε-), meaning "distant", and the Latin communicare, meaning "to share". The French word télécommunication was first invented in the French "Telecom Paris Tech" in 1904 by the French engineer and novelist Édouard Estaunié. Telecommunication is communication at a distance by technological means, particularly through electrical signals or electromagnetic waves. The concept has been around since the early days of human history, when smoke signals and drums were used to inform a person or groups of people of an event or situation especially in Africa, the Americas and parts of Asia. Pre-modern telecommunication included visual signals, such as beacons, smoke signals, signal flags and Optical telegraphs were commonly used in 1790's on Europe. An experiment on communication with electricity was started from 1726's. Practical electrical telegraph was proposed in 1837's. The conventional telephone now in use worldwide was first patented by Alexander Graham Bell in 1876, from than development of telecommunication industry accelerated. One of the most prevalent telecommunications devices is the telephone, an instrument that transfers vocal information from place to place. Two main types of phones are used in modern society, the analog-based, fixed-line telephone and the satellite-based, cellular phone. Cellular technology was first implemented in the 1970's using a network of satellites and radio towers. Varies technologies can be seen on Cellular technology. (William & Bill's, 2010)

But there are two main competitive technologies can be seen.

01. GSM (1st Generation-1G, 2nd Generation-2G, 3rd Generation-3G).
02. CDMA (Code Division Multiple Access).