

(LOCAS)

For GSM Networks

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by

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The Mobile Station (MS) location problem is the task of physically locating a cellular phone user within a cellular network, (in this particular research a Global System for Mobile communications (GSM) network), on a computerized map. Cellular users are mobile by nature, yet knowledge of their dynamic location is very useful information. Dynamic location information applications range from location sensitive billing to public safety services such as emergencies. In emergency situations, it is essential to know a cellular subscriber's location for effective emergency management.

The aim of this research was to investigate at the least, the development of a Mobile Station location calculation system (LOCAS) for a GSM network. This entailed the development of a software architecture for such a system. There are at least three critical decision factors that mobile network operators would consider before implementing a location system. These are accuracy, applications and services, and cost of deployment. Existing location systems are merely trade-offs of the above constraints, another aim of this research was focussed on reducing the cost of market entry of the location system, and thus enabling network operators to use the generated revenue to increase the location accuracy of the system. This in turn would increase the breadth of the applications and services that such a system can offer. In this way, this would produce an architecture of a location system that network operators could afford, and have the ability to enhance the services that this system can offer with time using the revenue generated from the system.

Current mobile station positioning schemes were looked into and a positioning scheme for LOCAS system was selected. A LOCAS software architecture was developed that attempts to meet the above-mentioned aims, an architecture of the system is given. Potential applications of the LOCAS system are given, though room for further research has been left. A simulation of the LOCAS system is demonstrated. Further research could involve the integration of LOCAS into a larger system that embodies various positioning techniques and protocols, a mobile positioning center.