

## **Abstract:**

### **Localised GPS (Design Entry no.288)**

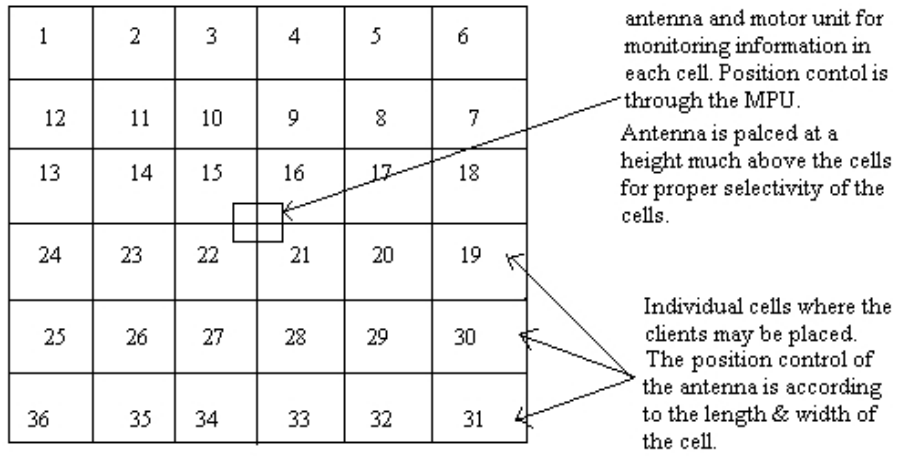
**Authors:** G.K.Siddhartha, Puneet Nayyar and Ajit Singh

The basic need associated with a system like this is to get position information about the occupants of a localised area eg. A Campus or Univ. The localised area is fragmented into hypothetical cells that are scanned by an overhead server having a high directivity helical antenna. Each authorised subscriber or client has hand-held equipment that communicates with the server. In this way the server maintains a position map about each client. A client can get the information about the position of any other client by requesting the server for the same. The information retrieved is displayed as a visual map of the area. The system is modular in nature and has single frequency operation thereby requiring simplified hardware and software. As an additional feature the client equipment is provided with a temperature logger.

Our GPS uses a unique protocol for bi-directional communication between server & client. The uniqueness of this protocol is defined by its architecture that makes the whole system working on a single frequency. It is based on Time Divisioned Polling / Multiplexing for data exchange between server & client. The handshaking signals consist of Sync, Acknowledge & Presence bits, the presence bit is sent by the clients whereas the other two by the server. The data comprises of an encoded bit pattern sent by the client as a query and the encrypted response sent by the server thus allowing only authorised client to avail the correct information.

During the full scan of the area the server is positioned at each block for a time 'T' wherein it issues a Sync pulse (ts) at the beginning. Normally each client is in receiving mode waiting for the Sync pulse, on the reception of which the Transmitter of the each client, in that cell, is switched on during its allotted time slot (Refer to the timing diagram) In this way the most important feature is accomplished by this protocol i.e. the Power Saving.

Another feature is the secure communication to prevent eavesdropping by non-subscribers. The server algorithm (refer figure B (c)) encrypts the reply to the query using a PRSQ. The client algorithm (refer figure C (b)) decrypts information using another PRSQ with a seed & a polynomial, common to the server & client.



a) Top view of the cell and antenna unit arrangement.

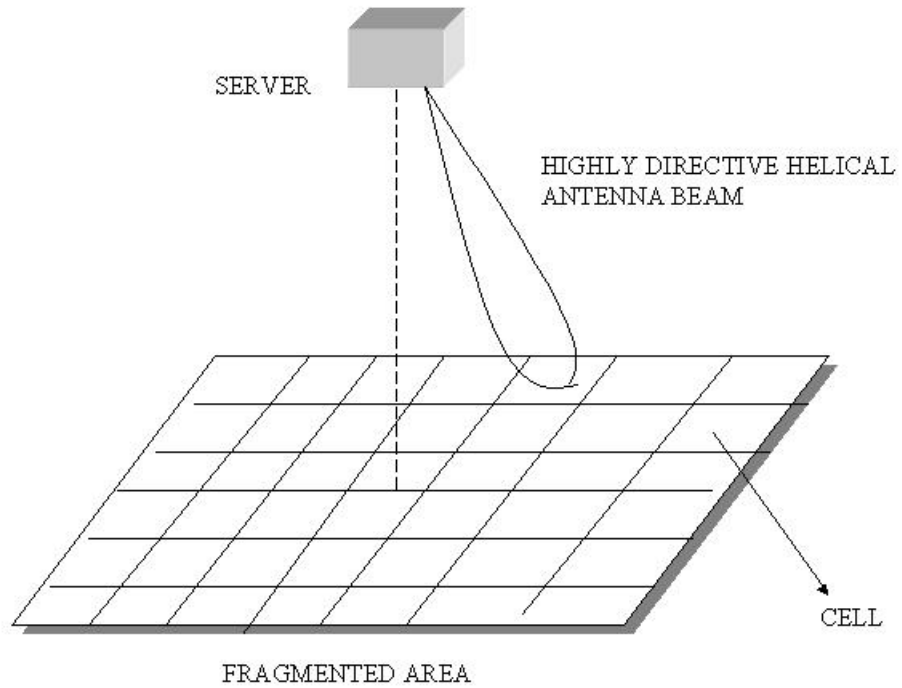


Figure A(b)

TIMING DIAGRAM OF SERVER AND CLIENT DEMONSTRATING  
THE SYNCHRONISATION BETWEEN THEM

