Location Update (GSM Location Update Procedure)									
Subscribers		GSM Network							
GSM Mobiles		Maryland Location Area		Maryland GSM	GSM Databases	Virginia Location	Virginia GSM Equipment		EventStudio System Designer 4.0
				Equipment		Area			
Other GSM Mobile	GSM Mobile	Rockville Cell	Bethesda Cell	Maryland MSC VLR	HLR	Vienna Cell	Virginia BSC	Virginia MSC VLR	01-Oct-08 20:39 (Page 1)

This sequence diagram was generated with EventStudio System Designer 4.0 (http://www.EventHelix.com/EventStudio). The EventStudio source files for this document can be downloaded from http://www.eventhelix.com/call-flow/gsm-location-update.zip.

Have you ever wondered how your cellular provider is able to route calls to you virtually anywhere? How does the cellular provider know where you are?

The short answer to these questions is that your cell phone keeps the cellular operator informed about your location. In this sequence diagram we will examine how a mobile phones keep selecting the best cell to service your call and also keeps the cellular provider informed about your location.

We will be tracing the journey of a mobile phone from Rockville, Maryland to Vienna, Virginia. The path taken by the mobile phone is described in the following article:

http://www.EventHelix.com/RealtimeMantra/Telecom/GSM\_network\_example.htm

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Before we go any further, let us discuss a few important terms.

Location Area (LA)

A GSM network is divided into cells. A group of cells is considered a location area. A mobile phone in motion keeps the network informed about changes in the location area. If the mobile moves from a cell in one location area to a cell in another location area, the mobile phone should perform a location area update to inform the network about the exact location of the mobile phone.

Home Location Register (HLR)

The HLR maintains a database for the mobile subscribers. At any point of time, the HLR knows the address of the MSC VLR that control the current location area of the mobile. The HLR is informed about a location area update only if the location area change has resulted in a change of the MSC VLR.

Mobile Switching Center - Visitor Location Register (MSC VLR)

The MSC VLR is responsible to switching voice calls and it also keeps track of the exact location area where the mobile user is present. Note that a typical MSC VLR will service several location areas.

that a typical MSC VLR will service several location areas.	
Rockville is the primary cell	The mobile phone is currently in the Rockville cell.
GSM Mobile reaches cell boundary (both cells in same Location Area)	
Monitor the BCCH from the current cell and the neighboring cells	When idle, the GSM mobile phone keeps monitoring the beacon frequency for its current cell(Rockville) and its neighbors. The GSM mobile measures the cell strength to see if it should change its primary cell. The signal strength of the Broadcast Control CHannel (BCCH) will be monitored to select the best cell
Location Area = Maryland, Signal Strength = Good	The BCCH on the primary cell is monitored for signal strength.
BCCH Location Area = Maryland, Signa Strength = Great	The BCCH of the neighboring cells is monitored to determine if any of the neighbors have a better signal strength. In this case, the cell has reached the boundary between Rockville and Bethesda cells and it finds that the signal quality of the Bethesda cell is better.
Bethesda is the primary cell	The mobile phone marks the Bethesda cell as the primary





