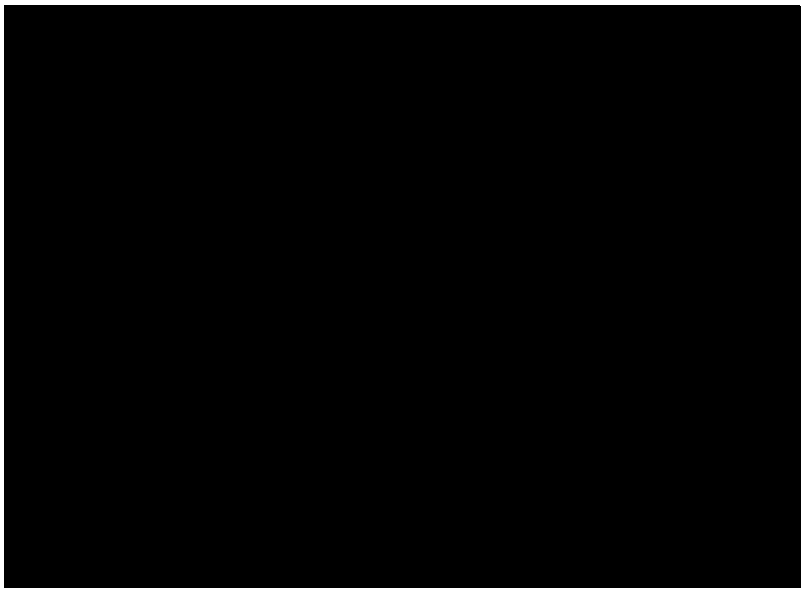
August, 2008

(S//SI//REL) GSM Tower Mapping Made Easier and More Accurate with New Tool

From: Menwith Hill Station (F77)

(TS//SI//REL) DYMO, a prototype development for directed GSM tower geolocation, outperforms existing GSM tower mapping data sets in geolocation accuracy, volume and available metadata.[1] With DYMO, metadata associated with the geolocation is 100% accurate. Unlike other systems that require revisits to locate a tower, DYMO is a one-shot system, supplying current information now – an important feature in the changing and evolving GSM environment. DYMO is flexible and can be used as a directed search tool or as a survey tool. Since its delivery to the New Mission Development Center / Midas Studies Lab on 7 May 2008, MHS has reported approximately 1080 tower geolocations to end users and identified new networks in Iraq and Iran. The concept of operations will allow for DYMO geolocation data to be used in generating imagery data.[2] When automated, this process will greatly reduce analyst work load.



(TS//SI/TK//REL) A tower located at the [redacted] demonstrates the power of the DYMO tool. Previous geolocation of the cell tower was 1.8 km west of the actual location with no metadata other than cell identification. DYMO geolocation produced the metadata for the tower, and placed the geolocation close enough to map the metadata to the physical tower.

(S//TK//REL) Historically, GSM tower mapping has been problematic. Existing GSM mapping tools are based on short collects, which produce large circular error of probability geolocations results. These results are then combined over many "visits." The end result is a low-level of integrity between the energy geolocated and any metadata produced. Often, metadata for a given location is unavailable, and when it does exist, it can be a time consuming process to marry up the metadata to the tower location.

(S//SI/TK//REL) DYMO was developed as a Midas Studies initiative, as GSM tower mapping is one of the National Reconnaissance Office's top 10 focus areas. Since DYMO's delivery, the system has been used virtually around the clock. The New Mission Development Center has performed over 123 collects, covering over 1,800 channels, in Iraq, Iran, Pakistan, Afghanistan, Somalia, Jordan, Kuwait, Saudi Arabia and Kenya. MHS has also completed about 50% of a comprehensive survey of central and southern Somalia, with over 220 towers located already.

(TS//SI//REL) In addition to a user-provided graphical user interface, the "post analysis" data is currently forwarded to both a local Google earth server and the Consolidated Operations Research Explorer system, where it can be fused with all-source SIGINT.[3] MHS is currently working towards integrating the DYMO processing flow within the future Integrated COMINT System (ICS) development system. Once in ICS, the system will be further tested and compared to the current GSM mapping tool to determine capability and future implementation.

(U//FOUO) POC: [redacted])

(U) Notes:

1. (S//SI//REL) Metadata includes general base station data such as base station identification, cell-ID, country and network codes, co-located and neighboring tower ARFCN values, for cell mapping and tower location. The system also provides accurate timing and TDMA frame number data for other applications associated with handset geolocation development.

2. (S//REL) DYMO works with GOLDENEYE, a developmental system that allows analysts to access imagery data in a more automated way. Recently, DYMO data samples have been posted to GOLDENEYE.

3. (U//FOUO) The tool provides the ability to output data in both .csv (comma delimited) and .kml (Google earth overlay) format.

(U//FOUO) Note: This article is reposted from MHS's Horizon newsletter, July edition.