The Adversary Deployment Exploitation Model (ADEM)

The Adversary Deployment Exploitation Model (ADEM) is an Enemy Course of Action (ECOA) development tool. ADEM enables:

- Representation of Adversary Long Distance Mobility Exercises
- Prediction of adversary deployment such as motorized infantry, armor, artillery, and TBM operations
- Story-boarding of operationally realistic OPFORs
- Consistency with Step 4 of the "Multi-service Tactics, Techniques, and Procedures for Theater Missile Defense Intelligence Preparation of the Battlespace (FM 3-01.16)"

The ADEM tool is used to plan for and predict adversary system deployments to better predict, plan, evaluate, overcome, and defeat them. The tool generates Named Area of Interests (NAIs) based on bottlenecks, switchbacks, as well as weather and logistical delays throughout the deployment process thus enabling target of opportunities for overhead sensors and attack operations.

Each ECOA is broken down into routes, which are a series of continuous waypoints, each waypoint has associated attributes: type of network, the speed associated with each leg of the route, and the number of attached entities; i.e. number of entities in the group. Each leg may be a Railroad, Highway, Primary Road, Secondary Road, Unpaved Road, or waterway. The user defines the speeds associated with each network type. The speed of vehicles and humans are affected by the environment. The ADEM tool uses temperature and precipitation to affect the actions of both. The ADEM tool adjusts the entity's speed based on weather, direction, number of entities, switchbacks, etc.

The ADEM tool utilizes multiple "user input" options; including ESRI ArcView files and Google Earth files. Users need not be an expert in either, ADEM makes importing quick and easy; see Figure 1.

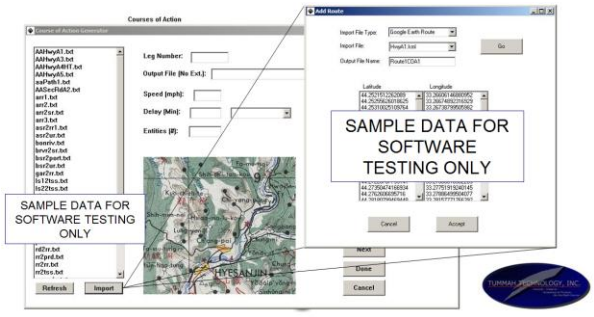

Figure 1 Google Earth Import Screen

ADEM enables users to:

- Model unlimited deployment COAs from Garrison to Forward Operating Bases

(FOBs) and beyond (including launch and hide sites)
- Model logistical delays such as loading and unloading equipment
- Model delays such as assembly time and concealment time
- Model traffic delays associated with convoys, switchbacks, and intersections

The ADEM tool generates Named Areas of Interests (NAIs) based on delays during deployment, weather, and the transportation networks used. The user defines the fidelity of the NAI generation from many to few. An example of a few NAIs is depicted in Figure 2.

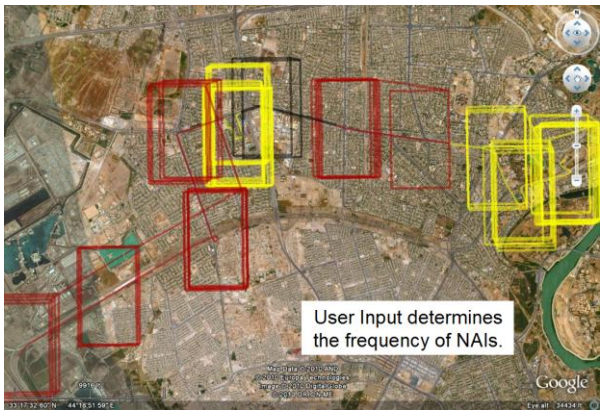

Figure 2 Generated Named Area of Interests (NAIs)

The ADEM tool enables the user to determine the timelines from Point A to Point B and associate a probability to each, and may update that probability real-time based on better INTEL. A function such as: **Ship airframes from storage facility to FOB** could require hundreds of potential COAs. Traveling via major highways could be one, as would traveling via back roads or railroads or even waterways. As one can imagine, a single deployment could have hundreds of potential COAs.

ADEM uses calendar and wall-clock time while generating the COAs thus enabling the user locate the entity(s) at any time during the deployment by entering the day and time. Figure 3 displays where a convoy is located during a recent deployment.

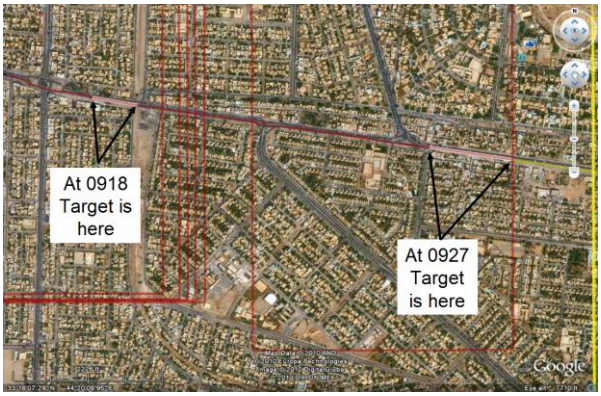

Figure 3 Time / Location Snapshot

During WF Exercises, the "Red Cell" may use the ADEM tool to automatically generate the highest probability COA, and export the routes and times of the movements to various digital simulation formats; such as EADSIM. Or, the COAs may be exported into MS Excel or ASCII text files.

After the COAs are generated, the user may view the deployment easily by viewing the deployment log; see example below.

1. Prior to leaving, Route 1 was to pause for 60 seconds, but actually paused for 82 seconds.
   Route 1 uses a Secondary Road at 20.1288244766506 m/s.
   Route 1 is defined in file: asr2rr1.txt, and deployed in file: asr2rr1.
2. Prior to leaving, Route 2 was to pause for 7200 seconds, but actually paused for 8317 seconds.
   Route 2 uses a Railroad at 24.6018965825729 m/s.
   Route 2 is defined in file: arr1.txt, and deployed in file: arr1.

The delays above show the affects of the environment during the COA generation.

For more information Contact:
tummah@comcast.net
www.tummah-technology.com