New and Enhanced Tools for Civil Military Operations (NET-CMO)

Problem Statement:
Civil military operations (CMO) do not have the capability to predict the location and intensity of mosquito-borne diseases, properly utilize spatial data with disparate resolutions and are limited to low resolution data in many denied regions.

End State:
Enhance current mission analysis for CMO to provide foreign humanitarian assistance, protect public health, support operations planning, and provide overall help for regional stability.
A. Provide spatial & temporal prediction of any mosquito-borne diseases
B. Provide risk maps detailing probabilities of contact with disease spreading vectors
C. Provide ArcGIS and MATLAB tools to discover optimal uniform pixel sizes when working with disparate spatial datasets
D. Downscale coarse spatial & temporal resolution data to more usable resolutions in data poor regions

Spatial Downscaling of Disease Statistics:

Mosquito-Borne Disease Prediction:
Trained disease incidence rate data in a stochastic extended Ross-MacDonald model to simulate the progression of a disease through both human and mosquito populations in space and time.

Optimal Uniform Pixel Size:
Optimal uniform pixel sizes are identified for spatial disparate datasets using two methods:
1. Semivariograms
2. Local spatial dispersion

Temporal Disaggregation:
Takes coarse temporal resolution disease data (annual cases) and distributes the data to a finer, monthly time series.