

## **GIS-Based Historical Aerial Photo Analysis for Environmental Remediation**

Glenn Frano

U.S. Army Corps of Engineers

Engineer Research and Development Center, Topographic Engineering Center  
7701 Telegraph Road, Alexandria, VA 22315-3864

The U.S. Army Engineer Research and Development Center, Topographic Engineering Center, Hydrologic and Environmental Analysis Branch (HEAB) conducts GIS-based Historical Aerial Photographic Analyses of current, closing, and former U.S. Military installations. HEAB also analyzes aerial photography to address other environmental concerns such as riparian analysis, historical wetland evaluation, shoreline changes, and watershed/land use mapping. The use of Geographic Information Systems or GIS is a primary component of the work and allows customers to view multi-layer "time-sequenced" data in a digital environment.

The identification and remediation of hazardous sites is a problem faced by many active, closing, and former U.S. military installations. These problems are complicated by the fact that many of these sites were created by practices and activities undertaken years or even decades ago. These hazardous sites are often completely obscured today due to the burial of materials, rapid revegetation, or dramatic changes in land use.

HEAB is an interdisciplinary team of geologists, geographers, foresters, biologists, physical scientists, photogrammetrists, and archival researchers. The team uses historical aerial photography, satellite imagery, maps, base plans, text, and ground photos to locate potential sites of environmental contamination such as chemical warfare materials (CWM), unexploded ordnance (UXO), radioactive material or landfill locations. In addition to locating potential contamination sites, HEAB conducts GIS-based Historical Photogeologic Analyses in areas where groundwater contamination is a concern. Surface features that can influence the migration of contaminants (rock fractures, sinkholes, drainage features, and wetlands) are mapped as baseline information for site characterization and/or for geophysical studies. Final products include a report, rectified and orthorectified image maps, detailed vector layer analysis, and photographic presentations in hard copy and/or on CD-ROM media.

These projects save both time and money by refining search areas for environmental investigation and by enabling more precise targeting of geophysical surveys. Study examples will be shown to illustrate GIS-Based Historical Aerial Photo Analysis for Environmental Remediation.