

Army Interest in Geographic Information Science

Russell S. Harmon, PhD

Army Research Office (AMSRD-ARL-RO-EV)

US Army Research Laboratory

GIS is a multidisciplinary research enterprise that addresses the nature of geographic information and the application of geospatial approaches to traditional basic scientific areas. Current Army interest in geospatial information science and technology includes general subjects such as: analytical methods, conceptual foundations, cartography and visualization, data manipulation and modeling, and geo-computation as well as more specific interests related to advancing the theory, methods, and models for geographic analysis; advancing human understanding of spatial conditions within specific operational environments, human and machine learning and reasoning about these conditions, and interaction between humans and computers; and exploring new conceptual spatial models for representing significant aspects of the natural, cultural, and infrastructure environment to better represent the complexity, provide computational efficiency, and/or advance the visualization.

Within the Army R&D community, GIS basic research is concerned with increasing knowledge about the interaction of terrain, weather, culture/human, and infrastructure and their combined affects on modern military operations through cognitive understanding of geospatial complexity. A comprehensive problem solving approach is desired that facilitates correlation of information across spatial and temporal scales, across multiple levels of organization, and across different disciplines that is facilitated through new spatio-temporal concepts and methods for gathering geospatial information, analysis/reasoning, modeling of geospatial data, and knowledge discovery from spatially and temporally referenced data..

Broad topics of current Army interest include: Human Cognition of BE Phenomena, Understanding the Urban Environment, Understanding Spatial, Temporal, and Social Networks, and Spatial Knowledge Discovery. Some specific questions of current interest include: (i) How is shared spatial information cognitively fused and assimilated for maximum understanding by the user? (ii) How does shared spatial information move within and across levels of physical and social systems? (iii) How do humans influence shared spatial information and respond to natural complexity of the environment within geospatially-enabled Battlefield Operating Systems? (iv) What new knowledge can be gained from scientific examination of correlation, patterns, and relationships in spatial information?