

Developing Knowledge-Enabled, Geographically-Aware Visual Analytics

NEVAC Overview

Begun in 2005, the North-East Visualization and Analytics Center (NEVAC) is one of five regional centers led by the National Visualization & Analytics Center and supported by the Department of Homeland Security. NEVAC is coordinated through Penn State's GeoVISTA Center.

The research team includes faculty and students from:

- Penn State's Department of Geography and College of Information Sciences and Technology
- Drexel University's College of Information Science and Technology

Government/industry collaborations have been established with The Port Authority of New York and New Jersey, VideoMining Corporation; and GeoDecisions, Inc.

Our fundamental scientific goal is to better understand how individuals and teams use information technology to analyze complex information, build knowledge, and make decisions - then to use this understanding to develop information technologies that enable these tasks. NEVAC directs particular attention to the challenges and opportunities of the exponentially increasing volume of information that includes geographic references.

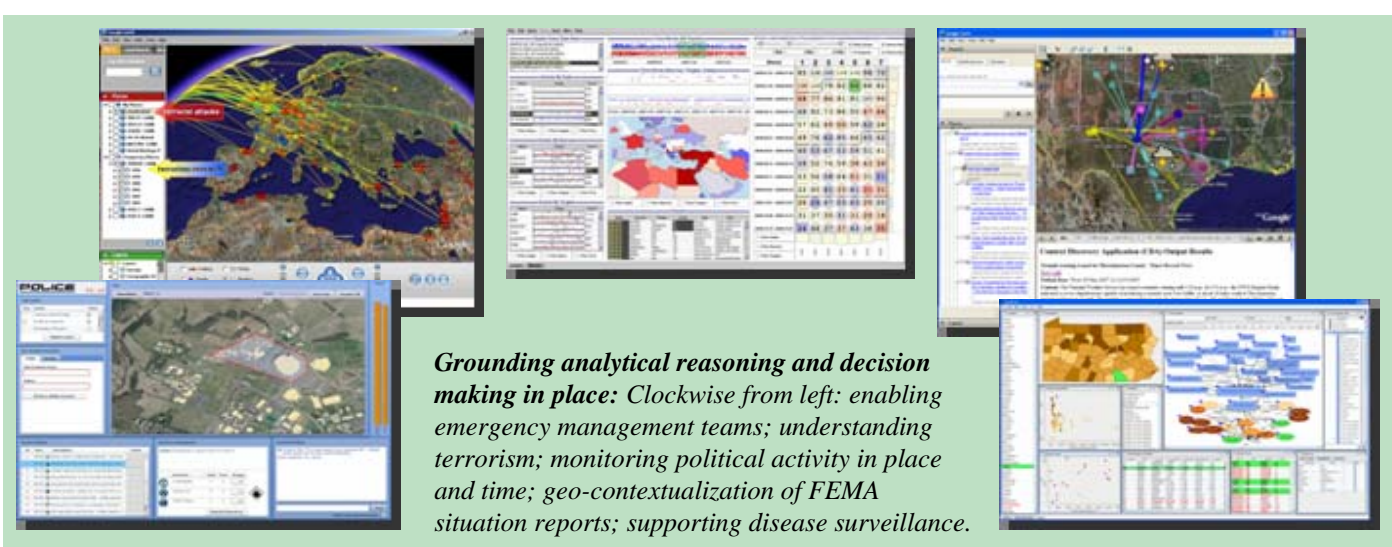
A central NEVAC research objective is to develop the conceptual approaches, methods and tools for leveraging explicit and implicit geographic references in heterogeneous data and for supporting incorporation of geographic and temporal information in analysis and decision making in the full range of homeland security contexts from threat assessment to disaster management.

To address this objective, the NEVAC research team is pursuing 3 core goals:

- *Visual analytics to exploit data complexity:* extracting useful information from distributed, heterogeneous, unstructured data of uncertain relevance by finding connections across diverse information fragments.
- *Visual analytics to generate domain-relevant actionable intelligence:* synthesizing, assessing, & abstracting assembled information to yield domain-relevant intelligence and developing methods/tools for constructing new knowledge grounded in both existing knowledge and analytic tasks.
- *Visual analytics to leverage individual and distributed team expertise:* to assess situations, interpret evidence, make decisions, & carry out actions across the range of contexts represented by intelligence analysis and emergency response.

These goals are addressed through focused research in four interconnected domains:

- information retrieval, extraction and contextualization from unstructured and semi-structured text documents,
- visual-computational methods for analysis of multivariate spatio-temporal data,
- knowledge management supporting capture and reuse of fragments of knowledge across distributed teams, and
- understanding and enhancing technology-enabled group work directed to analysis and decision-making.



Grounding analytical reasoning and decision making in place: Clockwise from left: enabling emergency management teams; understanding terrorism; monitoring political activity in place and time; geo-contextualization of FEMA situation reports; supporting disease surveillance.

For more information, contact:

Alan MacEachren, (814) 865-7491, maceachren@psu.edu

www.geovista.psu.edu/NEVAC