



*Developing the next generation of science and scientists in visual analytics*

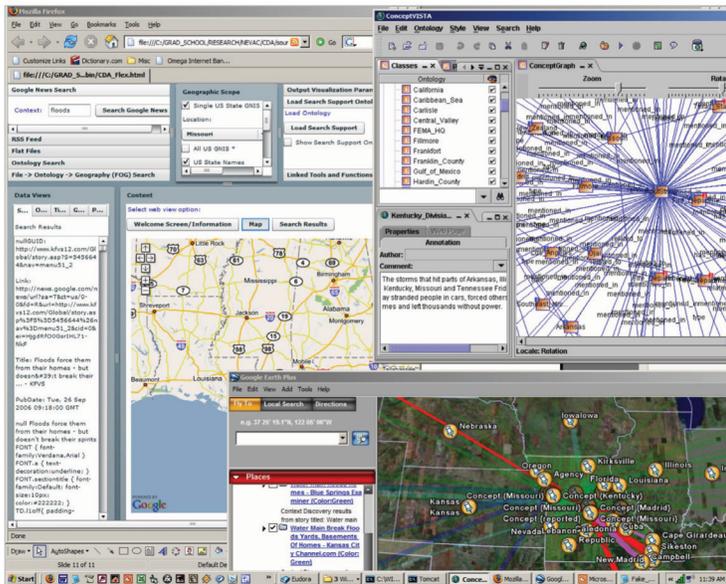
The Department of Homeland Security has established five Regional Visualization and Analytics Centers (RVACs) led by universities across the United States to develop visual analytics tools that can help analysts and emergency responders detect, prevent, and reduce the threat of terrorist attacks; identify and assess threats and vulnerabilities to our homeland; and recover from and minimize damage from national disasters.

The RVACs are affiliated with the National Visualization and Analytics Center (NVAC), which was established by DHS in 2004 and is led by Pacific Northwest National Laboratory. PNNL coordinates the efforts of the RVACs.

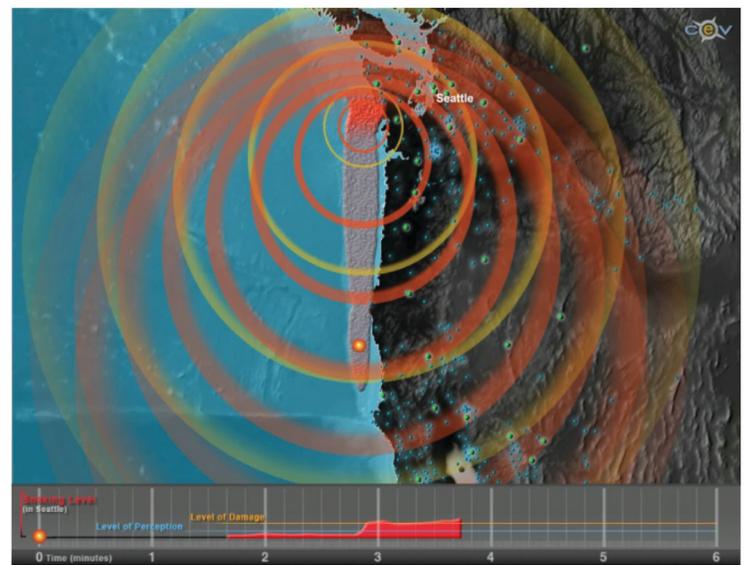
The RVACs are researching the next generation of visual analytics capabilities and establishing educational programs to educate the next generation of visual analytics researchers.

**Pennsylvania State University.** Penn State and partner Drexel University have formed the North-East Visualization and Analytics Center, doing research to help individuals and teams of analysts understand the spatial (“where”) and temporal (“when”) aspects of data. These elements are essential to helping analysts anticipate, prevent and respond to major events. Researchers are developing new methods to integrate knowledge, data and visualization tools to uncover and interpret emergent patterns.

**University of Washington.** UW has established a Pacific Rim RVAC, which includes experts from UW, British Columbia, Australia, New Zealand and Hawaii, as well as industry partners the Boeing Company and ChangeTools, Inc. The team is conducting research in collaborative visual analytics, which will enable teams of people in different locations to work together to conduct analysis.



The North-East Visualization and Analytics Center’s Concept Discovery Application



The Pacific Rim RVAC’s RimSim Simulation Platform

## Visual Analytics: Bringing Insight from Complex and Uncertain Information

Whether maintaining security of ports and borders, evaluating threats and vulnerabilities, or responding to disasters, homeland security personnel must make sense of large volumes of data of multiple types and from multiple sources. Often, this information is incomplete, uncertain, and conflicting.

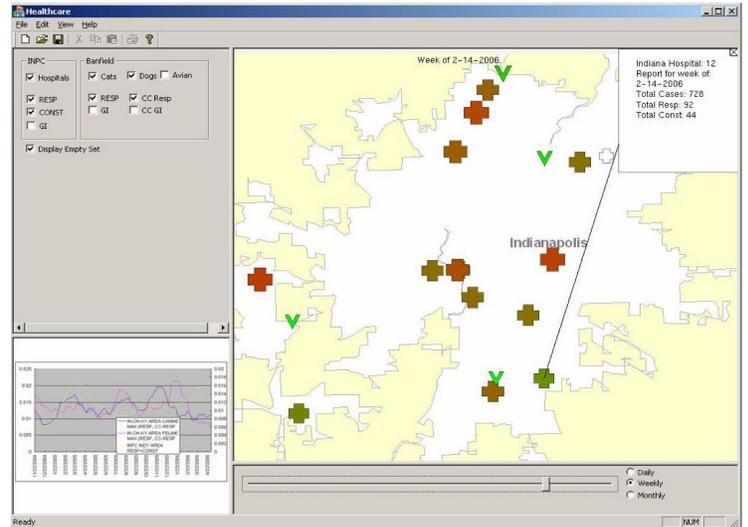
Visual analytics software tools leverage people's inherent ability to process visual information to help them interpret and analyze vast volumes of data. Visual analytics helps facilitate analytical reasoning about complex information to identify important trends, test hypotheses, and determine how best to take action.

**University of North Carolina at Charlotte and Georgia Institute of Technology.** UNC Charlotte and Georgia Tech's SouthEast RVAC are developing techniques and tools to aid in thinking about complex situations. They are creating new approaches for analysis of enormous multimedia databases, such as the data generated by the web in the forms of text, imagery, video and webcast.



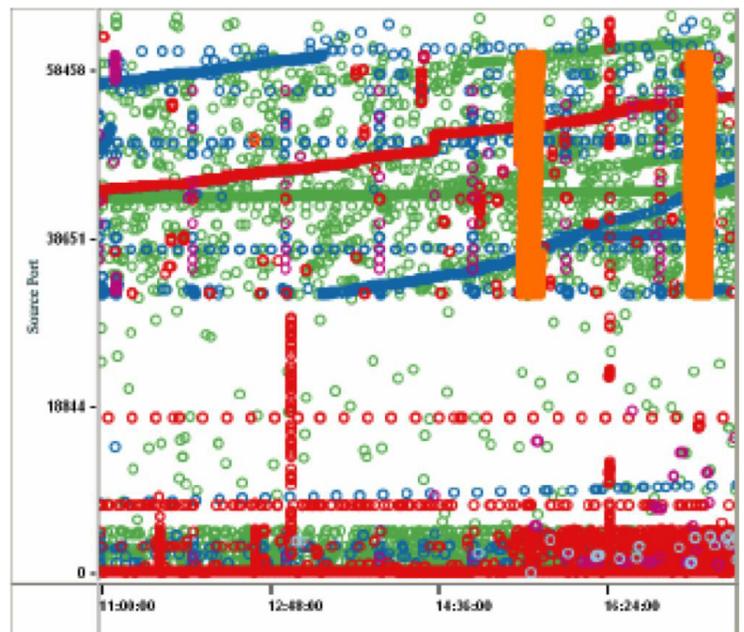
The Southeast RVAC's Image Annotation and Browser

**Purdue University and Indiana University School of Medicine.** Purdue and IUSM are performing research that will allow homeland security personnel at all levels to quickly and effectively extract, visually analyze and synthesize information so that they can make quick and accurate decisions. The team is focusing on three homeland security areas: analysis; emergency planning and response; and healthcare monitoring and management.



The Purdue RVAC's Linked Animal-Human Visual Analytics of Indiana Influenza Data

**Stanford University.** Stanford is developing new approaches for analyzing huge volumes of transaction data, which describe individual events such as cyber security data. Stanford is also developing novel visualizations to help users organize their information.



Stanford's Network Traffic Analytics