

Data Science @ Westat

Geospatial Expertise

From using geospatial relationships to enrich data frames and deliverables, employing spatial data to drive data collection logic, generating maps to visualize data, automating the identification and collection of travel with GPS and geolocation data from smartphones, to combining epidemiological and environmental data to plan field activities in a post COVID-19 world, Westat data scientists can optimize your study tasks.

Geospatial Domains and Expertise

We integrate geospatial data and analytics throughout projects helping researchers discover new trends in data, increase workflow efficiency, and reduce costs.

- In several **surveys employing address-based sampling**, we use map data from HERE and ArcGIS to automatically geocode sample frames, allowing for better tracking of field work and progress reporting.
- In **field studies**, Westat staff use geolocation data from devices (GPS) to ensure adherence to protocols and improve efficiency. In interviewing surveys, we use our proprietary EAGLE geospatial platform to process traces and detect falsifications.

- In **household travel surveys**, our DailyTravel app allows participants to use their own phones to automatically detect travel and simplify reporting via a prompted recall interface.
- For **public health and epidemiological research studies**, we employ geospatial techniques to analyze cancer incidence and exposure to environmental factors.
- In **virtual listing projects**, we use Google Maps and StreetView APIs to allow analysts to virtually walk and list sample.

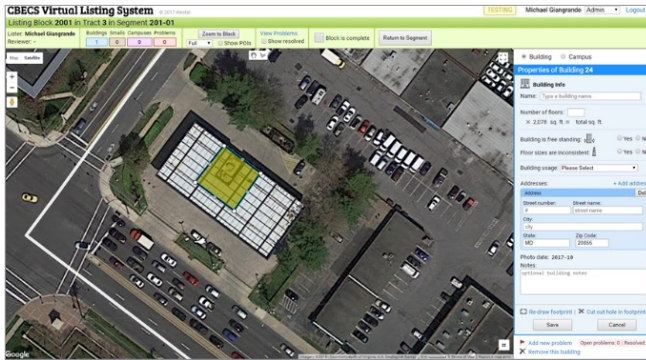
Tools and Technologies

In developing geospatial solutions, we employ a range of tools and components, including open-source tools and libraries, commercial off-the-shelf packages, and cloud-based web APIs:

- Commercial off-the-shelf geographic information system (GIS) products such as ArcGIS from Environmental System Resources Institute (ESRI)
- Open-source GIS applications such as Quantum GIS and servers such as PostgreSQL + PostGIS and Elastic Search
- Open-source libraries for multiple platforms such as R, Python, Java, and .NET
- Commercial web APIs from Google and Microsoft to automate location searches, address geocoding, and provide mapping support to applications

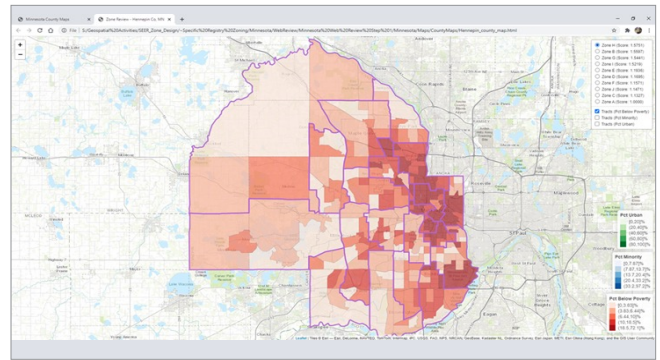
Illustrative Projects

- The **Commercial Buildings Energy Consumption Survey (CBECS)**, conducted for the U.S. Department of Energy, is the nation’s only comprehensive study of commercial buildings. It estimates the number, characteristics, and energy-use patterns of all types of buildings. Westat developed the Virtual Listing System (VLS) to allow central staff to list areas remotely using a Google Maps-enhanced web app to locate, catalog, and measure eligible buildings. This VLS provides several advantages over the traditional and costly on-the-ground approach:
 - ▶ Can be completed in less than half the time
 - ▶ Involves no travel expenses, saving projects money
 - ▶ With a centralized facility, supervisors can better manage multiple listers and easily answer questions.



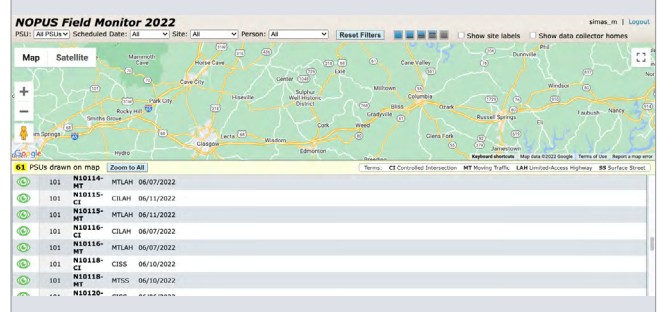
- The National Cancer Institute (NCI) is investigating how spatial context affects cancer risk, and Westat is contributing GIS expertise to the effort. We worked with individual state cancer registries and coordinated with NCI in collaboration with the North American Association of Central Cancer Registries (NAACCR) on the **NCI/NAACCR Zone Design** project to develop a set of cancer reporting zones across the U.S.

We recommended GIS web mapping tools, including tools for choosing mapping schemes and variables as well as classifying cancer rates. In addition, Westat works with NCI to develop map stories, which use narrative and map-based explanations to explore various cancer-related topics.



- The **National Occupant Protection Use Survey (NOPUS)** is a nationally representative field data collection program that provides estimates of the use of seat belts, child safety seats, motorcycle helmets, and cell phones. NOPUS is conducted annually, at approximately 2,000 sites, for the National Highway Traffic Safety Administration.

We incorporate GPS technology to provide driving directions and monitor field staff locations. Our GIS staff perform complex scheduling and mapping to support the field effort. Data are transmitted nightly and reviewed to ensure accuracy and completeness.



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