

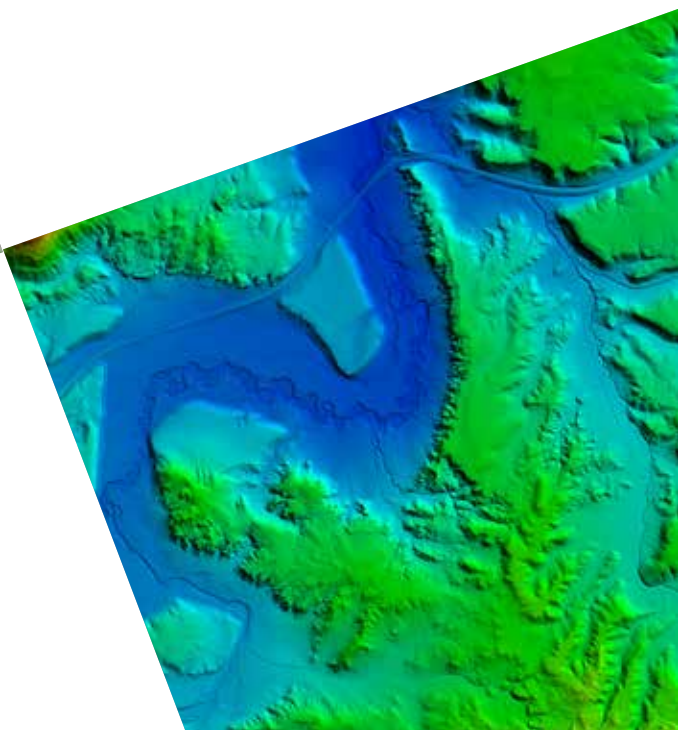


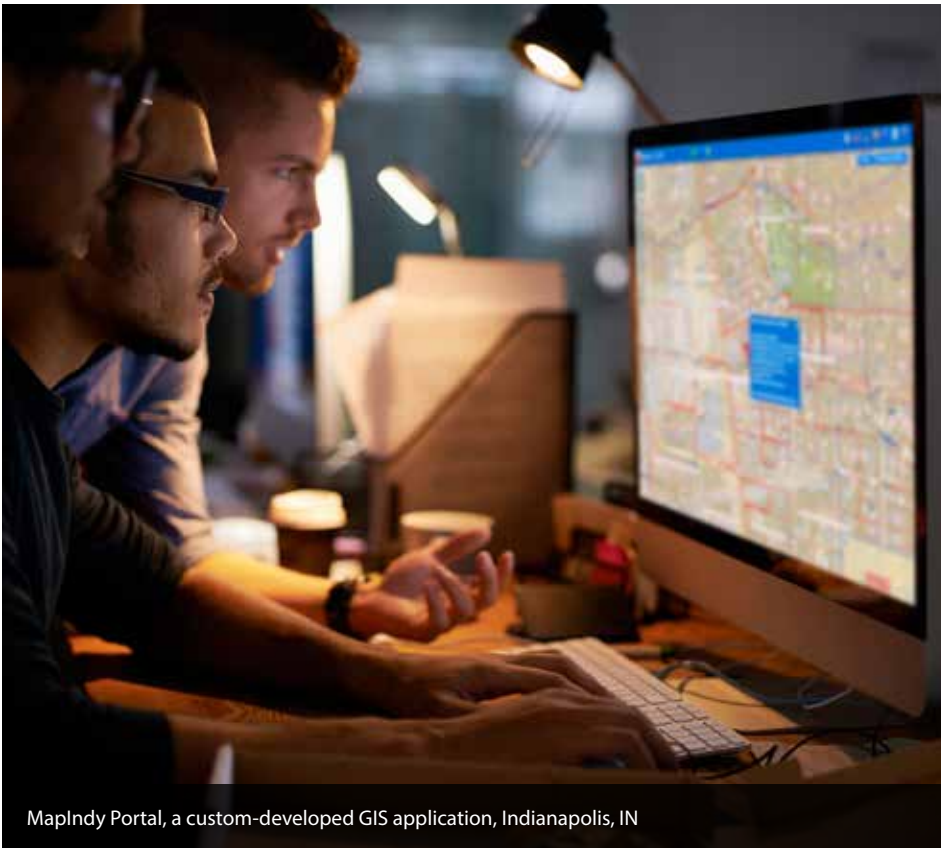
GEOSPATIAL SERVICES

LAY OF THE LAND



WOOLPERT
ARCHITECTURE | ENGINEERING | GEOSPATIAL





MapIndy Portal, a custom-developed GIS application, Indianapolis, IN

WOOLPERT BY THE NUMBERS



300+
Geospatial professionals
on staff



100+
Cities of lidar collection,
data processing and 3D
model building



7
State mapping projects
in the last five years



25+
Office locations
nationwide

GIS

Thousands of clients have realized tangible benefits from Woolpert's custom geographic information systems (GIS) solutions—solutions pivotal to establishing Woolpert as a leader in GIS innovation. Instead of selling software or pushing an agenda, we provide clients with unbiased, vendor-neutral recommendations that match state-of-the-art technologies to information needs and sustainable business processes.

Our full-service team provides the following GIS solutions:

- Consulting and strategic planning
- Data maintenance
- GIS training, staff augmentation and support
- Graphical outputs and media
- Implementation services
- Software and application development
- Solution and architecture design
- Workflow analysis

Research and Development

Woolpert's in-house research and development team brings together the power of the web, parallel computing, GIS, remote sensing and visualization to develop new methods for analyzing and serving geospatial information. While many other firms wait for new technology to hit the market, we work in tandem with industry-leading vendors to innovate the geospatial solutions our clients need now.

Applications

- 3D modeling
- Asset management
- Automated feature extraction
- Business intelligence
- Change detection
- Coastal management and restoration
- Consulting
- Contingency planning for disasters
- Corridor mapping
- Data analytics
- Digital terrain models
- Elevation data updates
- Emergency response support
- Environmental monitoring
- Flood mapping and analysis
- Forestry
- Hydrology
- Impervious surface delineation
- Land use/land cover
- Solar potential
- Strategic planning
- Surface models
- Urban modeling



3D model from oblique aerial imagery, Madison, WI

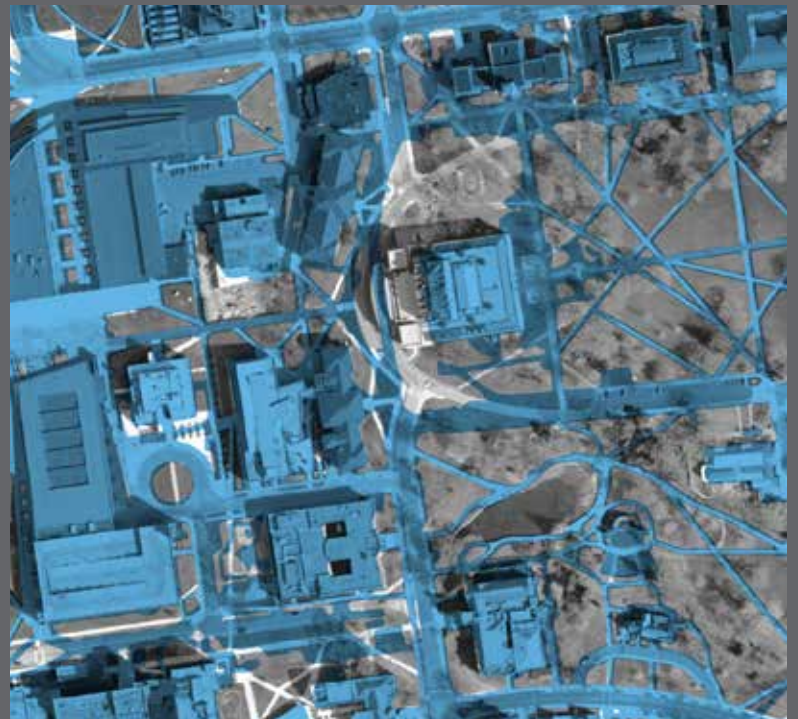
Photogrammetry and Remote Sensing

Woolpert is an industry-leading provider of geospatial data collection services. We merge decades of experience with a complete suite of technical resources to deliver geospatial projects on time and within budget. We provide the following data acquisition services (including simultaneous collection of multiple datasets):

- Bathymetric lidar
- Color infrared
- Digital imagery
- Hyper-spectral
- Lidar
- Mobile mapping
- Multi-spectral
- Oblique aerial imagery
- Terrestrial scanning
- Thermal imaging
- Traditional photography

Citywide Impervious Surface Mapping Columbus, OH

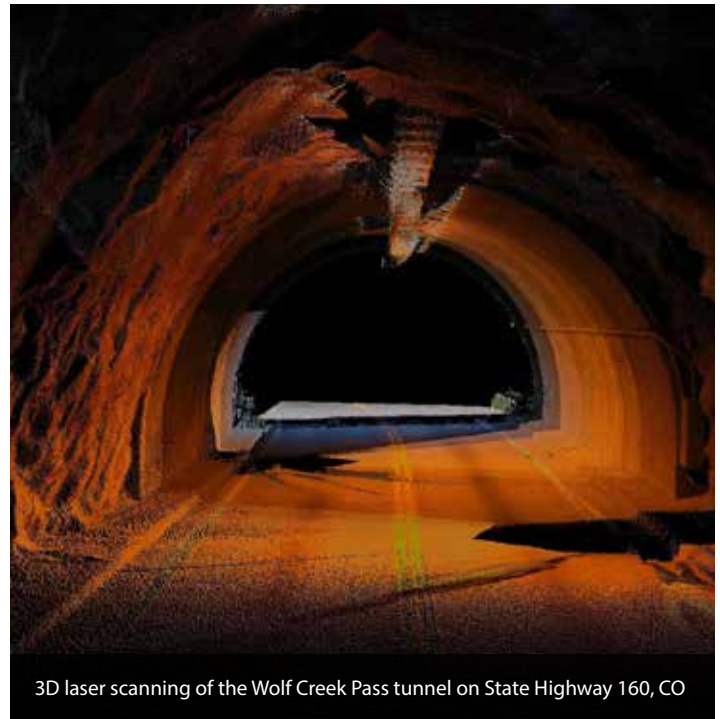
Woolpert leveraged lidar, aerial imagery and remote sensing expertise to collect impervious surface data for the city of Columbus' 600-square-mile stormwater service area. The improved data is used for maintaining the accuracy of the growing metropolis' ever-changing impervious surface maps, as well as supporting the city's stormwater billing program.



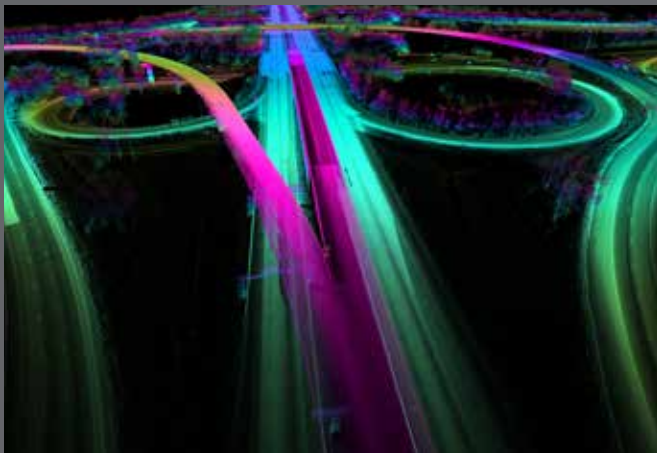
Surveying

From initial planning through design and construction, we offer the following surveying services to support all project stages:

- 3D laser scanning/as-builts
- Aeronautical surveys and obstruction analysis
- ALTA/boundary
- Construction
- Geodetic control/height modernization
- Ground-penetrating radar
- Highway design and right-of-way
- Hydrographic surveys/cross-sections
- Real property inventory (RPI)
- Subsurface utility engineering (SUE)
- Topography
- Utility infrastructure inspection
- Volume/stockpile calculations



3D laser scanning of the Wolf Creek Pass tunnel on State Highway 160, CO



I-64/I-264 Corridor Mapping Norfolk, VA

Deteriorating pavement conditions prompted the Virginia Department of Transportation (VDOT) to select Woolpert to survey and collect mobile lidar data for approximately 15 miles of interstate along the high-volume I-64/I-264 corridors. Combining conventional lidar with our innovative mobile mapping system (MMS) and working during less-busy overnight hours, Woolpert collected nearly 1 million points per second without risking crew safety. Woolpert met the aggressive two-month schedule at a fraction of the cost of a traditional lidar acquisition effort and delivered a wealth of extremely accurate, detailed data.

Mobile Mapping

Woolpert's mobile mapping system (MMS) combines state-of-the-art lidar sensors, high-resolution digital cameras and a position/orientation system into one mobile platform. Deployed on cargo vans, all-terrain vehicles, boats and even rail cars, our MMS collects survey-grade, 3D mapping data while on the move—at up to highway speeds. By removing surveyors from project sites, this mobile technology improves safety and eliminates disruptions to the motoring public.

Unmanned Aircraft Systems

Woolpert's unmanned aircraft systems (UAS) make it easier to acquire detailed spatial data over dangerous or inaccessible locations. We merge traditional data collection techniques with very untraditional unmanned aircraft to provide robust UAS services. Capitalizing on internal capabilities and strategic partnerships, we optimize the entire UAS workflow—from sensor selection, calibration and collection to processing and dissemination.

Woolpert provides clients with the following UAS services:

- Traditional orthophotography
- Colorized point clouds
- 3D reconstructed wireframes and meshes
- Livestream videos
- Virtual reality (VR) fly-throughs
- GIS data sets
- Automated and semi-automated feature extraction, as well as other remotely sensed products
- DSM, DTM, contours and other surface modeling products



Lidar imagery of Seal Island, ME

Lidar

We are known for the quality and accuracy of our lidar data. Our aircraft-mounted equipment indiscriminately samples everything in its path—trees, cars, buildings and, of course, the ground—to obtain highly accurate multi-look and foliage-penetrating measurements.

As a leader among lidar providers, we do more than just create traditional map products, such as contours and digital terrain models; we also create the following value-added products:

- Biomass and carbon/greenhouse gas calculations
- Building and structure outlines
- Emergency response plans
- Land cover characterizations
- Land use and land cover analyses
- Pre- and post-event/disaster planning
- Solar maps for photovoltaic array placement
- Transmission and utility maps
- Vegetation classifications



Statewide Lidar Tennessee

The USGS tasked Woolpert with collecting high-resolution lidar elevation data across 49 Tennessee counties. The data was shared across multiple state agencies, which combined resources to address needs that ranged from flood-risk management to coal mine reclamation.

"We wanted to acquire high-resolution elevation data to replace the current low-resolution elevation data, which does not suitably support the needs of the state. This plan provides highly accurate elevation data for a wide variety of consumers for pennies on the dollar."

Dennis Pedersen, director of GIS Services
Tennessee Department of Finance and Administration





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800.414.1045
woolpert.com