

The National Map - Orthoimagery Layer

The Nation Needs *The National Map*

Many Federal, State, and local agencies use a common set of framework geographic information databases as a tool for economic and community development, land and natural resource management, and health and safety services. Emergency management and homeland security applications rely on this information. Private industry, nongovernmental organizations, and individual citizens use the same geographic data. Geographic information underpins an increasingly large part of the Nation's economy.

The U.S. Geological Survey (USGS) is developing *The National Map* to be a seamless, continually maintained, and nationally consistent set of online, public domain, framework geographic information databases. *The National Map* will serve as a foundation for integrating, sharing, and using data easily and consistently. The data will be the source of revised paper topographic maps. *The National Map* includes digital orthorectified imagery; elevation data; vector data for hydrography, transportation, boundary, and structure features; geographic names; and land cover information.

Orthoimagery

Orthorectified digital aerial photographs and satellite images of 1-m pixel resolution or finer make up the orthoimagery component of *The National Map*. The process of orthorectification removes feature displacements and scale variations caused by terrain relief and sensor geometry. The result is a combination of the image characteristics of an aerial photograph or satellite image and the geometric qualities of a map. These attributes allow users to easily:

- Measure distance
- Calculate areas

- Determine shapes of features
- Calculate directions
- Determine accurate coordinates
- Determine land cover & use
- Perform change detection
- Update maps

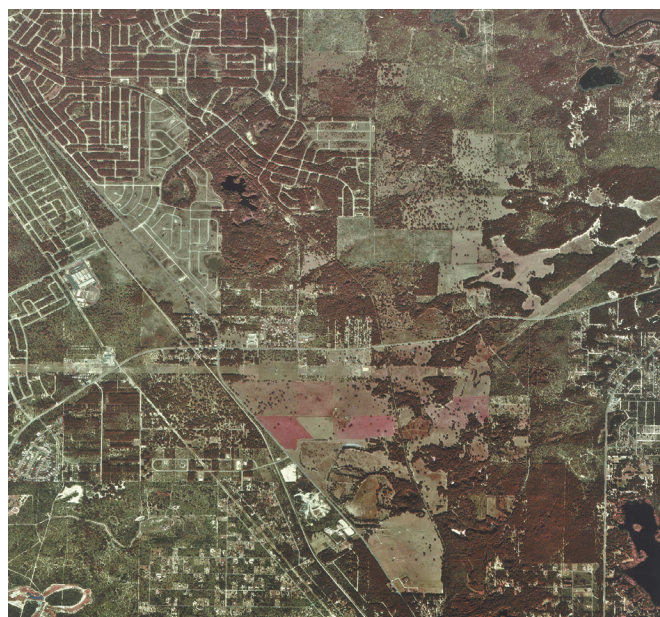
The traditional digital orthoimage is a 1-m resolution, 1:12,000 scale, panchromatic, natural color or color infra-red, quarter quadrangle product. It was initially built to USGS specifications, which included an ACSII header with descriptive information about the data. Many are now produced as GeoTIFFs and accompanied by an FGDC-compliant metadata file. The primary source for 1-m data is the National Agriculture Imagery Program (NAIP) which is leaf-on imagery. However 1-m, leaf-off orthoimagery is a common product in the eastern United States.

Applications of Orthoimagery

Digital orthoimagery is the foundation for most public and private Geographic Information Systems (GIS) and supports various geographic information analysis and mapping applications. These data are used to develop and revise vector files of transportation, cadastral, and land use/land cover information. Federal, State, and local agencies use orthoimagery for base maps for wetlands, soil, land parcel, farm-field boundary, forest inventory, and other natural-resource mapping, analysis, and planning applications. Local governments rely on orthoimagery to map land-property

boundaries and to manage their streets and other infrastructure assets. Orthoimagery serves as a seamless base map layer to which many other layers are registered; can be combined with digital elevation data for 3-D modeling and slope and terrain analyses; and is easily mosaicked to create seamless images of larger areas. Digital orthoimagery provides visual information for the following partial list of applications.

- Homeland Security
- Homeland Defense & Emergency Management
- Public Safety Planning, Response, & Mitigation
- Tax Parcel Mapping
- Transportation Management
- Operations & Planning
- Economic Development
- Utilities Management, Operations, & Planning
- Land Planning and Zoning
- Drainage Planning & Management
- Code & Permit Enforcement
- Agriculture
- Insurance
- Surveying & Mapping



Orthoimages provide information not easily represented on symbolized maps. (Holder, Fla.)

- Environmental Management
- Planning & Regulation
- Education
- Natural Resource Inventories and Assessments

Homeland Security Infrastructure Program (HSIP)

Many Federal, State, and local agencies now require a product with 1-ft or finer resolution, especially over densely populated urban areas. The USGS, National Geospatial Intelligence Agency, and Federal Geographic Data Committee initiated the HSIP which acquires 1-ft resolution digital orthoimagery and other data layers for selected U.S. cities through contracts and partnerships with other organizations. Those images cover a 1500m x1500m footprint, georeferenced to NAD83 datum and UTM coordinate system, and are true-RGB, GeoTIFF images with FGDC-compliant metadata. The HSIP has a 2-year acquisition cycle for 50 selected cities and a 4-year cycle for the remaining 83. Security and emergency operations over heavily populated urban areas provide the context for these coverages.

National Digital Orthophoto Program (NDOP)

The NDOP leads the effort to complete and maintain national coverage by orthoimagery with a resolution that is 1-m or finer. The NDOP is a consortium of Federal and State agencies, principally the USGS, Farm Service Agency (FSA), Natural Resources Conservation Service, U.S. Forest Service, Bureau of Land Management, Federal Emergency Management Agency, Bureau of the Census, National Oceanic and Atmospheric Administration, and National States Geographic Information Council, committed to providing national orthoimagery coverage by combining funding resources and creating partnerships to coordinate requirements and costs with Federal, State, other government agencies, and the private sector.

Data Availability and Plans

The orthoimagery maintenance plan consists of two approaches:

Files of 1-m resolution, leaf-on, digital orthoimagery are acquired through the FSA NAIP; leaf-off orthoimagery requirements are acquired through the

USGS. Both acquisitions focus on partnerships with Federal, State, and local agencies in order to combine resources. Files of 1-m NAIP imagery are collected on a 5-year cycle, whereas files of 1-m leaf-off imagery are acquired as requirements dictate.

Dissemination of 1-m or finer resolution digital orthoimagery acquired by USGS through contracts, agreements with other Federal, State, tribal or regional organizations, or direct purchases from private industry data vendors, will be available through:

- Geospatial One-Stop (<http://gos2.geodata.gov/wps/portal/gos>), a web-based portal for one-stop access to geospatial data and
- Seamless Data Distribution Service (<http://seamless.usgs.gov/website/Seamless/>), a web-based site for viewing and downloading no-cost, public-domain data.

Orthoimagery data also are accessible from the USGS by contacting any Science Information and Library Services office. Other Federal, State, and local agencies have their own programs for disseminating data independent of the USGS.

The USGS will not duplicate orthoimagery data holdings unless archiving or disseminating the data is part of a cooperative agreement. Rather, USGS will rely on those agencies to make their orthoimagery accessible on an NSDI Clearinghouse node in the public

domain. Whenever possible, USGS will link to other sites and services for orthoimagery data. Selected internet sites to search for orthoimagery data distribution and web image services are:

- Geospatial One-Stop (<http://gos2.geodata.gov/wps/portal/gos>)
- *The National Map* (<http://www.nationalmap.gov>)
- The NDOP site (<http://www.ndop.gov/data.html>)

Partnership Opportunities

Organizations interested in partnering with the USGS to develop orthoimagery data for *The National Map* can contact the USGS geospatial liaison in their State. The list of liaisons is available at “For More Information” at geography.usgs.gov/www/partners/crreps.html.

Information

Further information about *The National Map* and orthoimagery is available from the National Geospatial Program, Mail Stop 511, USGS National Center, 12201 Sunrise Valley Drive, Reston, VA 20192. For additional information about *The National Map*, visit the nationalmap.gov Web site.

For information on other USGS products and services, call 1-888-ASK-USGS, or visit the USGS Publications Warehouse at <http://infotrek.er.usgs.gov/pubs/>. For additional information, visit the USGS home page at www.usgs.gov.



Orthoimages are a source of updated feature content for *The National Map* (Fred, La.).