

# Indiana Statewide Orthophotography Program

Presented by E.J. McNaughton and Jill Saligoe-Simmel, Ph.D.

**Abstract:** *Geographic Information Systems are a priority for homeland security in Indiana. This is evidenced by the 2005 Indiana Statewide Color Orthophotography Project led by the Indiana Counter-Terrorism and Security Council (CTASC). The orthophotography project is producing 1-foot and 6-inch orthophotography for the entire state of Indiana (36,418 square miles), 1-meter color-IR imagery, and digital elevation products. The Indiana 2005 Color Orthophotography Project is an example of how statewide coordination of GIS can benefit the State, local government, and citizens. The project demonstrates cost savings, multi-jurisdictional coordination, consistent standards statewide, the NSDI principle of "build once--use many times," shared funding, partnerships, bridging the digital divide, educational opportunities, and positive economic impact. We will describe challenges and opportunities including our funding solutions, the strength of the multi-jurisdictional team approach to project development, the ADS40 digital data acquisition method, and the broad constituency for this unique project.*

On the surface, the Indiana Statewide Orthophotography Program looks like similar programs across the nation. What makes Indiana's special are the differences in funding, collection technology, scope of work, proposal development, and constituency.

The project includes photography of the entire state of Indiana - approximately 36,602 square miles - with a 1000 foot buffer outside the state boundary. Where the border is a river, the buffer is 1000 feet *or* to the opposite bank of the river, whichever is greater. The data was acquired during leaf-off conditions, snow free, with less than 5 percent cloud cover. Flight lines overlap by a minimum of 30 percent, with downtown urban areas overlapping 60 to 80 percent to eliminate building lean and provide true orthoimagery. The acquisition began February 18<sup>th</sup> and ended April 14<sup>th</sup> (2 weeks ahead of schedule). Initial delivery is scheduled to begin August 2005 and the final delivery is set for March 2006.

The Indiana program was funded by a grant from the Department of Homeland Security (HLS) under guidance from the National States Geographic Information Council (NSGIC). The Indiana Counter-Terrorism and Security Council (CTASC) is administering these funds. As a stipulation of the HLS grant, 80 percent of the funds went to local entities. These funds were channeled through the State to the counties, who then the counties bought from a single contract statewide program. In addition to this grant money, funds were added by state and federal stakeholders, as well as the counties who opted to "buy up" for more accurate data.

The proposal was developed by a consortium of interested parties. The Counter-Terrorism and Security Council asked the Indiana Geographic Information Council (IGIC) to create a workgroup to develop and evaluate the proposals. Members of this workgroup came from state agencies, county and local governments, academia, and non-competing vendors. The workgroup produced a very technical document specifying a product that met the many needs of all of the stakeholders. While this activity may seem routine, the amount of work and the spirit of cooperation this group exhibited was a

breakthrough, demonstrating how GIS can successfully move forward in Indiana in the future.

The vendor selected, EarthData, collected all of the data digitally. EarthData used only one type of sensor, the Leica ADS40. This sensor allowed the simultaneous acquisition of seven bands of information. This "push broom" technology captured images along a scan line looking forward, downward, and backward from the aircraft. The sensor simultaneously captured black and white, natural color, and color Infrared data. This eliminated multiple passes with different types of film or multiple holes in the aircraft. Since this sensor received all the information from the same portion of the earth, there is a perfect registration of all the data sets. When the flight crews returned from a mission the digital data was ready to enter the ground processing and archiving stage.

For ground control, the vendor is using a combination of targeted and photo-identifiable ground control and airborne GPS controlled imagery. Approximately 500 control targets were used to support the missions. All ground control was tied to the Indiana High Accuracy Reference Network (HARN). About 50 surveyed QA checkpoints were dispersed throughout the state and used for aerial triangulation and orthorectification. These points are located on the photos and compared with the GPS derived locations. Project crews also surveyed an additional 100 photo identifiable points throughout the state for the QA blind check for external QC. All control data and information is being provided as part of the final deliverable products.

Other deliverables include a base product of 1 foot resolution color and 1 meter Near Infrared. In addition to the initial grant, the counties were given an option to buy up to 6 inch resolution color photography. Thirteen counties have purchased this option. A Digital Surface Model and near bare earth Digital Elevation Model are also being delivered. These models are accurate enough to create 2 foot contours - a separate project now in the financing and planning stages.

The data represent a seamless, current, highly accurate base map for the IndianaMap that will benefit emergency management and homeland security. The project has been structured to leverage the data for multiple applications while meeting the demands of its most demanding users – local government. As such, the public data will be used by municipal, county, state and federal government, universities and the private sector for additional data development and applications. This product will be public and widely distributed. Each county will receive a mosaic at their purchased resolution and eventually the raw photos. The State will receive 1 meter mosaics of the entire state and a near bare earth DEM.

IGIC is a not-for-profit corporation established in Indiana and recognized as the official statewide GIS coordinating body. We provide coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships. IGIC is the administrative body of the Indiana GIS Initiative, a grass-roots group of over 700 stakeholders. Through IGIC, a strong foundation of coordination exists along side an unprecedented spirit of collaboration. IGIC is a

representative council of over 12 different sectors that utilize GIS, including counties, cities and towns, state and federal agencies, utilities, surveyors, GIS service providers, and private industry. IGIC is also a member of the National States Geographic Information Council, and IGIC's Executive Director serves on the NSGIC Board of Directors.

The Indiana Statewide Orthophotography Program is an example of how statewide coordination of GIS can benefit the state, local government, and the general public. This project demonstrates cost savings, multi-jurisdictional coordination, consistent standards statewide, the NSDI principle of "build once – use many times", shared funding, partnerships, bridging the digital divide, educational opportunities, and positive economic impact. The project is based on a strong partnership with the State, local and regional government, universities, and the Indiana Geographic Information Council. For more information please go to <http://www.in.gov/ingisi/ortho/>

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**Authors:**

E.J. McNaughton  
Geographic Information Coordinator  
Indiana Department of Environmental Management  
100 N. Senate Ave.  
Indianapolis, IN 46204-2251  
Phone: (317) 232-8197  
Fax: (317) 233-2372  
[emcnaugh@idem.IN.gov](mailto:emcnaugh@idem.IN.gov)

Jill Saligoe-Simmel PhD  
Indiana Crisis Response Mapping Center  
140 N. Senate Ave.  
Indianapolis, IN 46206  
Phone: (317) 234-2924  
[jsaligoe@IUPUI.edu](mailto:jsaligoe@IUPUI.edu)