Imagery for the Nation

By the National States Geographic Information Council (NSGIC)

The Vision *The nation will have a sustainable and flexible digital imagery program that meets the needs of local, state, regional, tribal, and federal agencies.*

By Tony Spicci, President, NSGIC

The National States Geographic Information Council (NSGIC) is working with the National Digital Orthophoto Program (NDOP) Committee and the Federal Geographic Data Committee (FGDC) to create a new nationwide aerial imagery program that will collect and disseminate standardized multiresolution products on set schedules. Local, state, regional, tribal, and federal partners will be able to exercise buy-up options for enhancements that are needed by their organizations. The imagery acquired through this program will remain in the public domain and archived to secure its availability for posterity.

The Program

This is a massive undertaking that will require two separate, but well-coordinated, programs.

The existing National Agricultural Imagery Program (NAIP) administered by the U.S. Department of Agriculture will be enhanced to provide annual one-meter imagery over all states, except Alaska (see below) and Hawaii, which will be acquired by NAIP every three years. This program will typically collect imagery during the growing season (leaf on) in natural color.

A companion program will be administered by the U.S. Geological Survey (USGS). Under this program, Alaska will receive one-meter imagery for the entire state once every five years. This program will also produce one-foot resolution imagery once every three years for all states east of the Mississippi River and all counties west of the Mississippi River with population densities greater than 25 people per square mile. This program will typically acquire imagery during winter and spring months (leaf off) in natural color.

Value of Imagery

Orthoimagery provides the visual content of an aerial photograph while being as accurate as a map for measurements. These qualities allow users to easily

- Measure distance.
- Calculate areas.
- Determine shapes of features.
- Calculate directions.
- Determine accurate coordinates (locations).
- Determine land cover and use.
- Perform change detection.

Orthoimagery is displayed in E-911 response centers to dispatch first responders to exact locations and for tracking incoming calls from mobile phones. Police in squad cars and rescue workers in fire trucks analyze orthoimagery before responding to emergencies. Digital images are used to collect a wide variety of information, including transportation routes, wetlands, streams, shorelines, building outlines, timber stands, land-use patterns, farm fields, and crop types.

Local governments rely on orthoimagery to map land property boundaries and manage their streets and other infrastructure assets. Orthoimagery serves as a seamless basemap layer to which many other layers are registered. It provides visual information for the following partial list of applications:

- Homeland security, homeland defense, and emergency management
- Public safety planning, response, and mitigation
- Tax parcel mapping
- Transportation management, operations, and planning
- Economic development
- Utilities management, operations, and planning
- Land planning and zoning
- Drainage planning and management
- Code and permit enforcement
- Agriculture
- Insurance
- Surveying and mapping
- Environmental management, planning, and regulation
- Education
- Natural resource inventories and assessments

Program Benefits

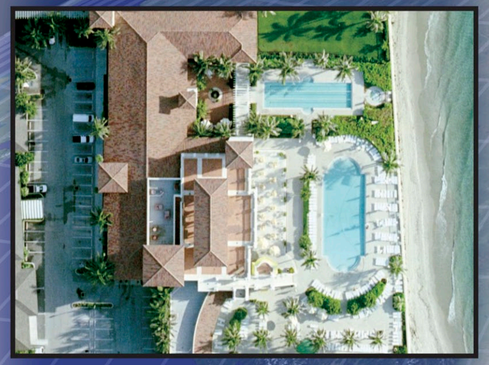
This program can be operated and managed using federal contracts with multiple professional firms at a lower cost (~25%) than the current independent contracts managed by federal, state, and local governments. It offers outstanding value to local governments and smaller states because price breaks are achieved by contracting for larger areas.

The national program cost estimate of $111 million per year includes imagery acquisition and processing costs, contract management, quality control, quality assurance, data distribution, and archiving. Generally, these costs add approximately 14 percent to orthoimagery production costs.

A national imagery program lacking the suite of coordination mechanisms outlined here (current state) would cost nearly $485 million over three years. Cost savings in four areas can reduce this to ~$333 million. The first two are the large area and other cost savings cited above. The third (~25%) comes from reducing duplication of effort and program redundancy. The final factor is a 19 percent return on investment (ROI) value that is achieved through adherence to standards. NSGIC and NDOP estimate the following cost savings for each of these factors during each three-year cycle:

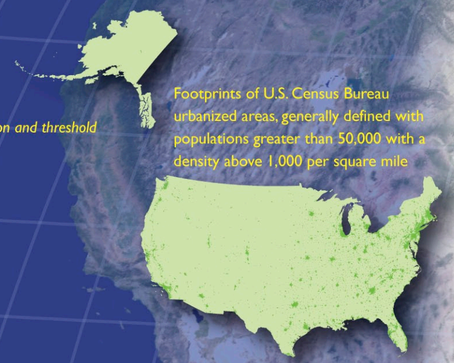
Large area	$57,717,000
Other costs	7,510,000
Duplication	53,644,000
ROI	40,770,000
Total savings	**$159,641,000**

Six-inch resolution imagery



Natural color image from SURDEX, Palm Beach, Florida

Image type	Natural color
Leaf on or off	Off
Cloud cover	0%
Horizontal accuracy	2.5 feet at 95%, NSSDA (National Standard for Spatial Data Accuracy)
Location and threshold	Footprints of U.S. Census Bureau urbanized areas, generally defined with populations greater than 50,000 with a density above 1,000 per square mile



Frequency	Every three years
Local cost share	50%
Federal program steward	USGS
Buy-up options	100% cost for color-infrared or four-band product 100% cost for increased frequency 100% cost for increased footprint 100% cost for increased horizontal accuracy 100% cost for three-inch resolution 100% cost for better elevation data products 100% cost for removal of building lean (true ortho)

One-foot resolution imagery

EarthData image of tornado damage, Maryland Department of Natural Resources

Image type	Natural color
Leaf on or off	Off
Cloud cover	0%
Horizontal accuracy	5 feet at 95%, NSSDA
Location and threshold	All areas east of the Mississippi River and all counties west of the Mississippi River with more than 25 persons per square mile

Frequency	Every three years
Local cost share	None
Federal program steward	USGS
Buy-up options	100% cost for color-infrared or four-band product 100% cost for increased frequency 100% cost for increased footprint 100% cost for increased horizontal accuracy 100% cost for sampling product to lower resolution 100% cost for six-inch resolution 100% cost for better elevation data products 100% cost for removal of building lean (true ortho)

One-meter resolution imagery

Natural color image of Adams County, Nebraska, USDA NAIP program

Image type	Natural color
Leaf on or off	On
Cloud cover	10%
Horizontal accuracy	25 feet at 95%, NSSDA
Location and threshold	Entire nation, including all insular areas and territories

Frequency	Every year in the 48 conterminous states; every five years in Alaska; every three years in Hawaii, insular areas, and territories
Local cost share	None
Federal program steward	U.S. Department of Agriculture, except Alaska USGS for Alaska
Buy-up options	100% cost for color-infrared or four-band product 100% cost for increased horizontal accuracy