

## **Issue: Statewide Color Orthoimagery 2010 and Color Infrared Imagery**

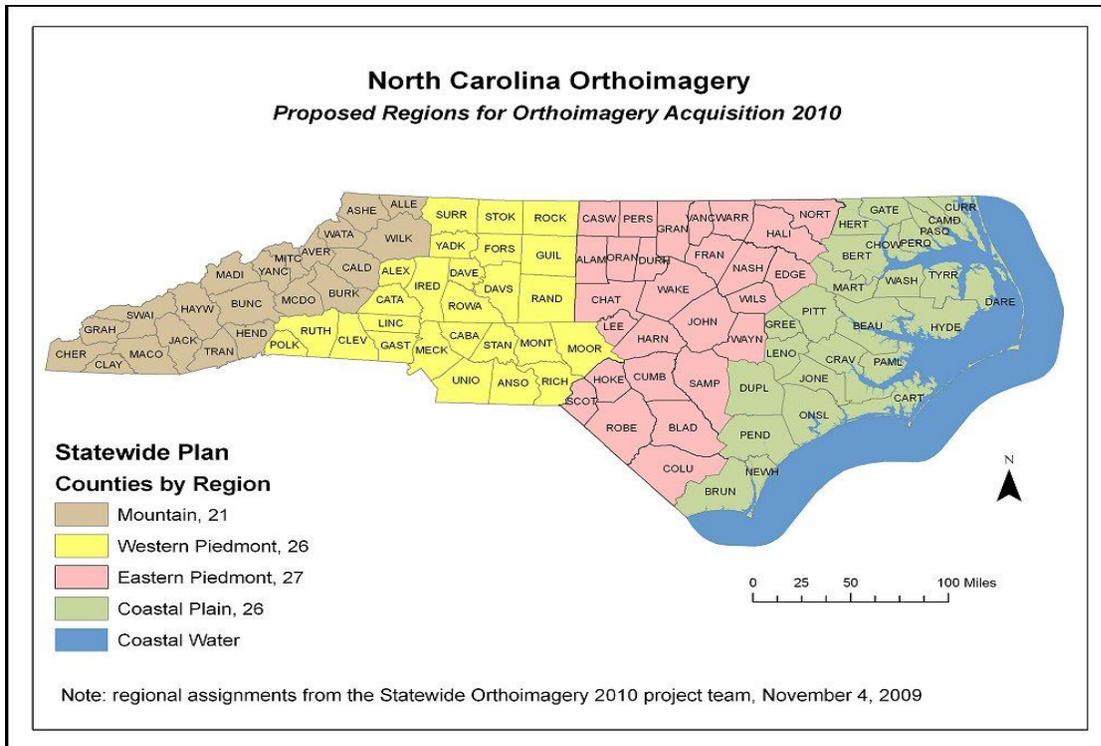
The NC Statewide Orthoimagery 2010 Project is producing 6-inch, leaf-off, color imagery, distributing datasets to 100 counties, and providing free public access through NC OneMap: [www.nconemap.gov](http://www.nconemap.gov). The Statewide Project is not producing color infrared imagery using the near infrared or 4th spectral band from the data collected by the digital sensors. Color infrared is outside of the statewide project scope and budget. In response to questions about color infrared, the project team prepared a fact sheet on technical issues related to color infrared imagery (page 3, below).

Is your organization considering acquisition of color infrared aerial imagery in an area of interest? Or do you seek other products that could be derived from data that has not been processed into tiles? If yes to either question, there may be a way to reduce the cost of new products.

For a limited time, imagery processing contractors from the NC Statewide Orthoimagery 2010 Project will retain data files from interim stages of processing that may reduce the cost of color infrared imagery products for areas of interest. If your organization is interested in engaging a contractor to produce color infrared imagery, the interim files, also called exploitation images (see Fact Sheet, Technical Process), represent a head start compared to raw imagery files. You must contact the contractor before June 2011 to take advantage of potential costs savings from using the interim tiles. After June 2011, it is likely that only raw imagery files would be retrievable from contractor archives (requiring more processing to produce color infrared or other products).

Contact information for contractors that processed color imagery is contained in metadata records to be distributed to counties. Check your metadata! The metadata will be available online through NC OneMap later in the spring.

Figure 1 displays the four regions of the imagery acquisition contractors: AeroMetric (coastal) and Surdex (eastern Piedmont) under a prime contractor (ESP Associates); and Photo Science (western Piedmont) and Sanborn (mountains) under a prime contractor (AMEC).



**Figure 1: Acquisition Contractors by Region.**  
**From West to East: Sanborn, Photo Science, Surdex, and AeroMetric**

If lower resolution color infrared imagery is adequate for your needs, the US Department of Agriculture, with state cost share from the Department of Environment and Natural Resources, produced a statewide 2009 product (leaf-on, 1-meter resolution). For more information on the National Agriculture Imagery Program (NAIP) see:

<http://www.apfo.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai>

The NAIP 2009 imagery is available as a map service through NC OneMap:  
[http://ge-nt.ncmhtd.com/cgi-bin/naip2009ir.cgi?Layers=NAIP 2009 IR WMS&](http://ge-nt.ncmhtd.com/cgi-bin/naip2009ir.cgi?Layers=NAIP%2009%20IR%20WMS&)

North Carolina Statewide Orthoimagery 2010 Project Team

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## Fact Sheet: Processing the 4th Band

**Current Situation:** The Statewide Orthoimagery Project 2010 is producing true color (3-band) orthoimagery. The digital sensors used in the project collected a fourth band (near infrared), but the scope (and budget) of the project does not include production of color infrared imagery using the fourth band.

**Resource:** Files from an interim stage of imagery processing could be retained as a potential starting point for a third party that had resources to generate color infrared imagery products on their own outside of the 2010 statewide project.

**Roles:** NC Geospatial & Technology Management Office (GTM) is managing four private contractors who acquired the digital imagery (one-fourth of the state each) and are processing the products. NC Center for Geographic Information and Analysis (CGIA) is managing the overall project including data distribution and online access. The contractors are managing the interim data that are not project deliverables.

**Sensor:** The Intergraph Digital Mapping Camera (DMC) sensor is used throughout the statewide project.

### Technical Process:

The DMC sensor consists of eight cameras that collect raw image data. The raw image data is usually copied from the DMC's storage system to some other storage media, often a portable hard drive or tape that is shipped to a company's base office. The raw image data on the portable hard drive or tape is then post-processed using Intergraph software (delivered with the DMC) into a virtual image whose format is compatible with many types of software. This virtual image format is referred to as an "exploitation" image. The exploitation image can be panchromatic (black & white), true color (red, green, and blue bands), color infrared (CIR), or 4-band including the near infrared band depending on the user's selection at time of post-processing the raw image data. The exploitation image is the interim format (not a project deliverable) that is managed by the imagery contractors during the project.

**Disk Storage Space:** Estimates based on NCDOT tests with the DMC sensor indicate that a single 4-band exploitation image requires 500 MB of disk storage space. There are 222,000 exposure images in the statewide imagery collection, which translates to about 111 terabytes (TB):  $(500,000 \times 222,000 = 111,000,000,000)$ . The storage space for the exploitation images for an average county is about 1.1 TB.

**Storage:** Under the *North Carolina Technical Specifications for Digital Orthophoto Base Mapping*, an orthoimagery contractor is responsible for storing the raw image data for at least five years, but there is no provision for storing the interim files (exploitation images) beyond their utility in the project.

**Cost of Processing 2010 Project Data into Color Infrared Imagery:** A statewide dataset would cost at least \$2 million as an add-on after the 2010 project, and would require about 18 TB of disk storage space for TIFF format. Producing color infrared imagery was outside of the statewide project scope and budget.

**Cost of Obtaining Copies of the Intermediate Files:** The cost estimates for access to the data from private contractors vary and depend on the area of interest, and procedures for retrieval, copying, and handling. This is a custom process that third parties would initiate and negotiate with the private contractors.

**Third Party Access to Contractor Data:** After June 2011, third parties will still be able to generate CIR imagery from raw image files, starting from the initial processing stage for locations of interest. For example, if a county were to identify a need for CIR imagery late in 2011, the county (or its contractor) would request raw images from the original acquisition company and incur a cost for data retrieval and transfer. The county (or its contractor) would use the raw image data to create exploitation images that include the 4th band. Then the 4-band exploitation images could be ortho rectified to create CIR orthoimagery. The aero triangulation data, seam lines, and updated terrain model from the 2010 project could be used as is, but image distorted features (such as bridges) that were corrected in the true color orthoimagery would need to be corrected again in the CIR orthoimagery. In this example, the absence of the 4-band exploitation images from the statewide project would mean the county would redo (or pay for) the initial processing.

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