



## National Agriculture Imagery Program (NAIP) INFORMATION SHEET April 2012

### What is the National Agriculture Imagery Program (NAIP)?

NAIP is a program to acquire “leaf on” aerial imagery during peak growing season and deliver this imagery to USDA County Service Centers, to maintain the common land unit (CLU) boundaries and assist with farm programs.

The goal of NAIP is to collect 1-meter imagery for the entire conterminous United States. The imagery is acquired in “four band” producing both a natural color and color infrared product.

While the focus of NAIP is on agricultural areas, FSA funds and cost share partnerships between federal agencies are leveraged to acquire full state coverage.

### Who acquires the imagery?

Independent contractors acquire the NAIP imagery. During the last NAIP contract cycle, 6 primary contractors flew imagery for the USDA Farm Service Agency (FSA).

Contractors are selected via “best value” criteria. Contract bids are evaluated on past performance, ability and capacity to perform the work, and cost. Secondary contracts between NAIP cost share partners and NAIP vendors are allowed, subject to FSA approval.

A downloadable PDF of the contract can be found on the APFO website (<http://www.apfo.usda.gov>), under the Contract Services subject, Business Opportunities topic.

### How is the imagery acquired?

NAIP imagery is acquired from aircraft using film or digital cameras that meet rigid calibration specifications. No film cameras were used for the 2010 NAIP acquisition. Digital sensors may use a continuous collection technology, or may use set “exposures,” similar to film based acquisition.

### Aircraft...what about satellites?

Commercial satellite imagery may also be used in NAIP contracts although it has not been used yet. In 2004, the contract specified a spatial resolution of 1 meter or less in all color bands. In 2005, the requirement was changed to allow PAN sharpening of color bands in satellite or aircraft acquired NAIP imagery.

### What is the spectral resolution of the imagery?

The default is 3-band natural color, or Red, Green, Blue (RGB) imagery. A “buy-up” option of 4-band imagery, with red, green, blue, and near-infrared bands is permitted. Either natural color or color infrared imagery (CIR) is displayed by changing the band assignments in the viewing software. Through funding by FSA and agency partners all of the 2010 NAIP imagery was 4-band.

### What spatial resolution is the imagery?

NAIP imagery has a 1-meter ground sample distance (GSD). Beginning with the 2011 NAIP season, ½-meter GSD imagery is available through a contract “buy up” if the additional funding for the higher cost of the imagery is available from state or federal partners.

In earlier years of NAIP, some states were flown at a 2-meter GSD for compliance uses. NAIP is now 1-meter GSD only.

### What is reference ortho imagery?

Until 2006, the horizontal accuracy of all NAIP imagery was inspected by comparing the NAIP imagery to existing orthorectified imagery. The imagery used was the mosaicked digital ortho quarter quads (MDOQ) which were initially used to digitize FSA common land unit (CLU) data. The NAIP imagery was required to match within 5-meters to the existing MDOQs.

Beginning in 2006, ground control points were used for inspecting some of the NAIP imagery. During this time, existing imagery was also used for inspecting the majority of the NAIP imagery.

### What is the absolute accuracy specification?

From 2006 – 2008, nine states were selected to meet the absolute ground control specification: Utah in 2006, Arizona in 2007, and Indiana, Minnesota, New Hampshire, North Carolina, Texas, Vermont, and Virginia in 2008. Beginning in 2009, all states flown adhered to this specification.

The contract states that “all well-defined points tested shall fall within 6 meters of true ground at a 95% confidence level”. Ground control points used in production and/or inspection should improve the horizontal accuracy of the product.

## 🌿 Is the imagery reviewed to make sure it is accurate?

APFO has stringent imagery compliance guidelines, and all deliverables are inspected using automated and visual methods to ensure accuracy and compliance with the contract.

## 🌿 How long has NAIP been in existence?

NAIP pilot projects began in 2001 and 2002. The program has continued to grow ever since. After an initial five year cycle and a transition year (2008), 2011 is the third year of the 3 year acquisition cycle.

The cycle schedule avoids concentrating states lying in areas where weather conditions make acquisition difficult.

Much of the funding for the program is provided by other federal, state, and regional governments. Partnering on an endeavor such as NAIP is important because it reduces duplication of effort and fiscal waste.

## 🌿 In what formats can I receive the imagery?

Imagery comes in two main formats:

1. Compressed County Mosaic (CCM)
  - a. Mosaics are generated by compressing digital ortho quarter quads (DOQQs) into a single mosaic.
  - b. Compression for 2005 – 2010 Natural Color NAIP was MrSID MG3 at a ratio of 15:1.
  - c. Compression for 2004 NAIP and earlier was MrSID MG2 at a ratio of 50:1 or 20:1 for 1m or 2m resolution imagery respectively.
  - d. In 2008, 4-band NAIP imagery was compressed with JPEG2000. JPEG2000 is currently not used for NAIP.
  - e. The 2011 CCMs are 3-band, MrSID MG3.
  - f. Coverage of the CCM extends 1 mile or more beyond the county boundary.
  - g. The mosaic may cover all or portions of an individual county or project area.
2. Digital Ortho Quarter Quad (DOQQ).
  - a. Each individual image tile (DOQQ) within the mosaic covers a 3.75 x 3.75 minute quarter quadrangle plus a 300 meter buffer on all four sides.
  - b. The DOQQs are available in GeoTIFF format.
  - c. In 2007: 4-band acquisition for AZ. All others 3-band.
  - d. In 2008: 4-band acquisition in CT, IN, KS, MA, RI, TX, VA, and VT. All others 3-band.
  - e. In 2009: 4-band acquisition for CO, DE, GA, ID, MD, MT, ND, OR, SC, and WA. All others 3-band.
  - f. In 2010 and 2011: 4-band for all states acquired that year.

- g. All individual DOQQs and the resulting mosaic are rectified to the specified UTM coordinate system.

## 🌿 How can I get NAIP imagery?

1. Compressed County Mosaics (CCMs) are available for delivery 30 days or less after the end of the state flying season, through the USDA Geospatial Data Gateway (<http://datagateway.nrcs.usda.gov>). All years of available imagery may be downloaded as either 1 or 2 meter CCMs depending on the original spatial resolution. Downloads are free, but depending on your internet connection may be slow. CCMs with a file size larger than 4 Gb may not be downloaded from the Gateway. These counties may be purchased from FSA. Pricing and delivery methods can be found in the contact information listed below.
2. Full resolution quarter quads (DOQQs) are available after being inspected through APFO's Customer Service Section on media only. Media options include hard copy, CD/DVD, and portable hard disc drives.
3. Orders for CCMs and DOQQs on media can be placed at the Aerial Photography Field Office (APFO) in person, or at <http://www.apfo.usda.gov>. Select *Find out more about the NAIP Imagery Program*, then *Ordering NAIP Imagery*.
4. NAIP DOQQs can be added into a GIS project for viewing only through APFO's ArcIMS or ArcGIS servers. For more information, see "*How can NAIP be accessed?*" by visiting the APFO website and follow the steps given in #3., above.

## 🌿 How much does it cost?

Costs vary greatly by product and volume. Contact the APFO Customer Service Section at [apfo.sales@slc.usda.gov](mailto:apfo.sales@slc.usda.gov) or at 801-844-2922 for detailed information.

## 🌿 Do I need special software to view the imagery?

1. NAIP CCMs from 2005 -2010 require software that reads the MG3 or JPEG2000 format. Four band imagery will require software which can recognize all four bands. A list of free viewing software is available at <http://www.apfo.usda.gov>. Select *Get a viewer for my digital imagery*. This list is provided for convenience; USDA-FSA-APFO does not support or endorse these products or services.
2. Most image viewing software will display GeoTIFF files.

## 🌿 Who do I contact for more information?

1. For sales information, contact USDA-FSA-APFO at 2222 W 2300 S, Salt Lake City UT, 84119-2020, call 801-844-2922, or visit <http://www.apfo.usda.gov>.
2. For further information contact the NAIP Program Manager Kent Williams at 801-844-2908, or GIS Specialist David Davis at 801-844-2933.