



National Agriculture Imagery Program (NAIP) INFORMATION SHEET May 2009

What is the National Agriculture Imagery Program (NAIP)?

NAIP is a program to acquire peak growing season “leaf on” imagery, and deliver this imagery to USDA County Service Centers, in order 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 either natural color or “four band” imagery, and is delivered in the year of acquisition.

NAIP will be flown for agricultural areas, and partnership cost shares often assist in acquiring full state coverage. Minimum cost share in individual states is 10% of FSA costs or \$21,500, whichever is greater.

Who acquires the imagery?

Independent contractors acquire the NAIP imagery. There are currently 6 primary contractors flying 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 that have sensor systems meeting rigid calibration specifications. Digital sensors may use a continuous collection technology, or may use set “exposures,” as in film based flying.

Aircraft...what about satellites?

Commercial satellite imagery may also be used in NAIP contracts. In 2004, the contract specified spatial resolution of 1 meter or less in all color bands. In 2005, the requirement was changed to allow PAN sharpening of color bands to reach a resolution of 1 meter ground

sample distance (GSD). Although commercial satellite imagery can be used, it hasn't been to date.

What is the spectral resolution of the imagery?

The default is natural color, or RGB imagery. A “buy-up” option is “four band” imagery, with red, green, blue, and near infrared bands. Either natural color or color infrared imagery is displayed by changing the band assignments.

What spatial resolution is the imagery?

NAIP imagery has a 1 meter ground sample distance (GSD) with a horizontal accuracy; inspected locations match photo-identifiable ground control points with an accuracy of within 6 meters at a 95% confidence level or (in the earlier years of NAIP) match within 5 meters of reference ortho imagery.

In earlier years of the NAIP program, some states were flown at a 2 meter GSD for compliance purposes. Beginning in 2008, NAIP was 1 meter GSD only.

What is reference ortho imagery?

The reference ortho imagery was the mosaicked digital ortho quarter quads (MDOQs), initially used to digitize FSA common land unit (CLU), or earlier years of NAIP.

In order to measure the accuracy of deliverable imagery, it must be compared to some type of control imagery/points. Until a pilot in 2006, the control imagery was the existing baseline imagery.

What is the absolute accuracy specification?

From 2006 – 2008, nine states were selected to meet 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 will adhere to this specification.

The contract states that “95% of well-defined points tested shall fall within 6 meters of true ground”. Ground control points used in production and/or inspection should ensure a more horizontally accurate product.

● Is the imagery reviewed to make sure it is accurate?

APFO has stringent imagery compliance guidelines, and all deliverables are inspected to ensure accuracy and compliance with the contract. Because NAIP is an annual program with short flying seasons, some defects, such as a maximum 10% cloud cover are accepted.

● How long has NAIP been in existence?

NAIP pilot projects began 2001-2002. The program has continued and grown since. After an initial five year cycle and a transition year (2008), 2009 marks the start of a second acquisition cycle.

The cycle schedule avoids flying states lying in areas where weather conditions make acquisition difficult within the same year.

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 – 2008 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 imagery was compressed with JPEG2000.
 - e. In 2009 Natural Color compression will be either MrSID MG3 (RGB states) or JPEG2000. (4 band states). There will be no 4-band CCMs.
 - f. Coverage of the CCM extends up to 1 mile beyond the county boundaries.
 - g. The mosaic may cover all or portions of an individual final product.
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.
 - d. In 2008: 4 band acquisition for DOQQs and CCM in CT, IN, KS, MA, RI, TX, VA, VT.
 - e. In 2009: 4 band acquisition for CO, DE, GA, ID, MD, MT, ND, OR, SC, WA.

All individual DOQQs and the resulting mosaic are rectified to the UTM coordinate system, NAD 83 are in a single predetermined UTM zone.

● How can I get NAIP imagery?

1. Compressed County Mosaics (CCMs) are available for delivery 30 days after imagery acquisition, through the USDA Geospatial Data Gateway (<http://datagateway.nrcs.usda.gov>). All available imagery for all years flown may be downloaded, whether 1 and 2 meter CCMs. Downloads are at no charge, but download times may be slow. It may be recommended to order the imagery on CD or DVD.
2. Full resolution quarter quads (DOQQs) are available after being inspected and accepted through APFO's Customer Service Section, on media only. Media options include hard copy, CD/DVD and portable hard disc drives (firewire and USB2).
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, visit 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 or at 801-844-2922 for detailed information.

● Do I need special software to view the imagery?

1. CCMs from 2005 - 2009 NAIP 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 open and view 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 Louise Mathews at 801-844-2934.