



# NAIP 2008: Issues and Enhancements

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NAIP 2008 Post Mortem

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# Outline

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- JPEG 2000 Compression
- Seamline Shapefile
- Absolute Control
- NAIP Survey



# JPEG 2000

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- Why switch to JPEG2000?
  - 4-band acquisition
    - 9 multi-spectral states (CT, IN, KS, MN, RI, TN, TX, VT, VA)
  - MrSID MG3 doesn't yet support compression of 4-bands
  - JPEG2000 is non-proprietary

# JPEG 2000 Vs. MG3

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- MG3
  - Doesn't exhibit "blurriness"
  - Software compatible
  - Currently cannot handle a 4-band image
- JPEG2000
  - Non-proprietary
  - Multitude of settings
  - Issues may or may not be fixable
  - Support is somewhat limited

# JPEG 2000 Issues

- Blurring
  - Many CCMs are exhibiting blurriness
  - Possible reasons
    - Settings
      - Code Blocks
      - Tile Parts
      - Tile Length Markers
      - Layers
    - Alpha channel issues
  - Fixes
    - Maximize values on above settings (ex. set tile length markers to "255")
      - Could potentially increase file size
      - Could potentially affect actual compression ratio
      - Could potentially affect refresh rates
    - LizardTech has a patch that "may" correct blurring



# JPEG 2000 Issues

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- Imagery Disappearing at Certain Zoom Levels
  - Zoom scales larger than 1:30,000: image disappears or becomes a gray pixelation

# JPEG 2000 Issues

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- Rendering
  - CCMs over a certain size (8.5 billion pixels or ~3,200 sq/mi) will cause ArcGIS 9.1 (SP2) to fail
    - Reason for this is a known bug that ESRI will not fix
    - 9.2 fixes this problem
    - Current work-around is to split larger CCMs

# JPEG 2000 Issues

- Viewing Difficulty in Different Software Applications
  - ArcView 3.x
    - Does not read JPEG2000 images
    - Some FSA county offices are still using ArcView
      - Requires GeoJP2 ArcView plug-in from LizardTech
  - ERMapper
    - Causes loading errors if ECW plug-in is installed
      - ArcGIS cannot read JPEG2000
    - Fix is to uninstall ECW plug-in
  - Global Mapper
    - "Patching" with distorted coloration





# Seamline Shapefile

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- Why switch to seamline?
  - More and more digital acquisitions
  - More accurate date and time representation of when a particular area is acquired
    - Parts of the imagery representing a standard DOQQ shapefile may have been collected on different dates
  - Seamlines provide an accurate boundary representation of imagery

# Seamline Shapefile

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- Pilot program in 2007 (Arizona)
- 6 states in 2008
  - IN, IA, KS, OK, TX, VA
- Contract requirements
  - Polygon for each exposure used to create CCM
  - No gaps in polygons
  - No overlapping polygons
  - No multiple part polygons
  - No polygons smaller than 40,470 square meters (~10 acres)
  - Data table attributed correctly for each polygon
  - Shapefile coverage represents the extents of the visible imagery



# Seamline Shapefile

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- Why is it important to meet contract requirements?
  - Allows for precise identification of when a particular area was acquired
  - Consistent and accurate data is important to the integrity of NAIP

**Seamline Shapefile Error Check**

Input seamline shapefile  
 S:\gateway\ccm\naip\2008\in\18019\ortho\_1-1\_1m\_j\_in019\_2008\_1.shp

Geodatabase  
 C:\SCSS\2008\_seamline\_shapefile\_inspection\indiana.mdb

Output Feature Dataset  
 in001\_2008\_seams

Output Feature Class  
 in001\_2008\_seams\_fc

Feature Class Cartographic Coordinate System (optional)  
 As Specified Below  
 NAD\_1983\_UTM\_Zone\_16N

Output Topology  
 in001\_2008\_seams\_topology

Topology Cartographic Coordinate System (optional)  
 As Specified Below  
 NAD\_1983\_UTM\_Zone\_16N

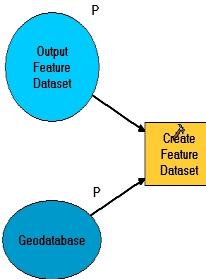
Output polygons  
 C:\SCSS\2008\_seamline\_shapefile\_inspection\indiana.mdb\in009\_2008\_polygons

Output Polygons Cartographic Coordinate System (optional)  
 As Specified Below  
 NAD\_1983\_UTM\_Zone\_16N

OK Cancel Environments... << Hide Help

**Seamline Shapefile Error Check**

This model is designed to assist with QA inspection of the seamline shapefile associated with Compressed County Mosaics (CCM) in the NAIP program.



# Seamline Shapefile

- Inspection Results
  - 375 counties currently inspected
  - Counties from all 6 states



Inspected Counties

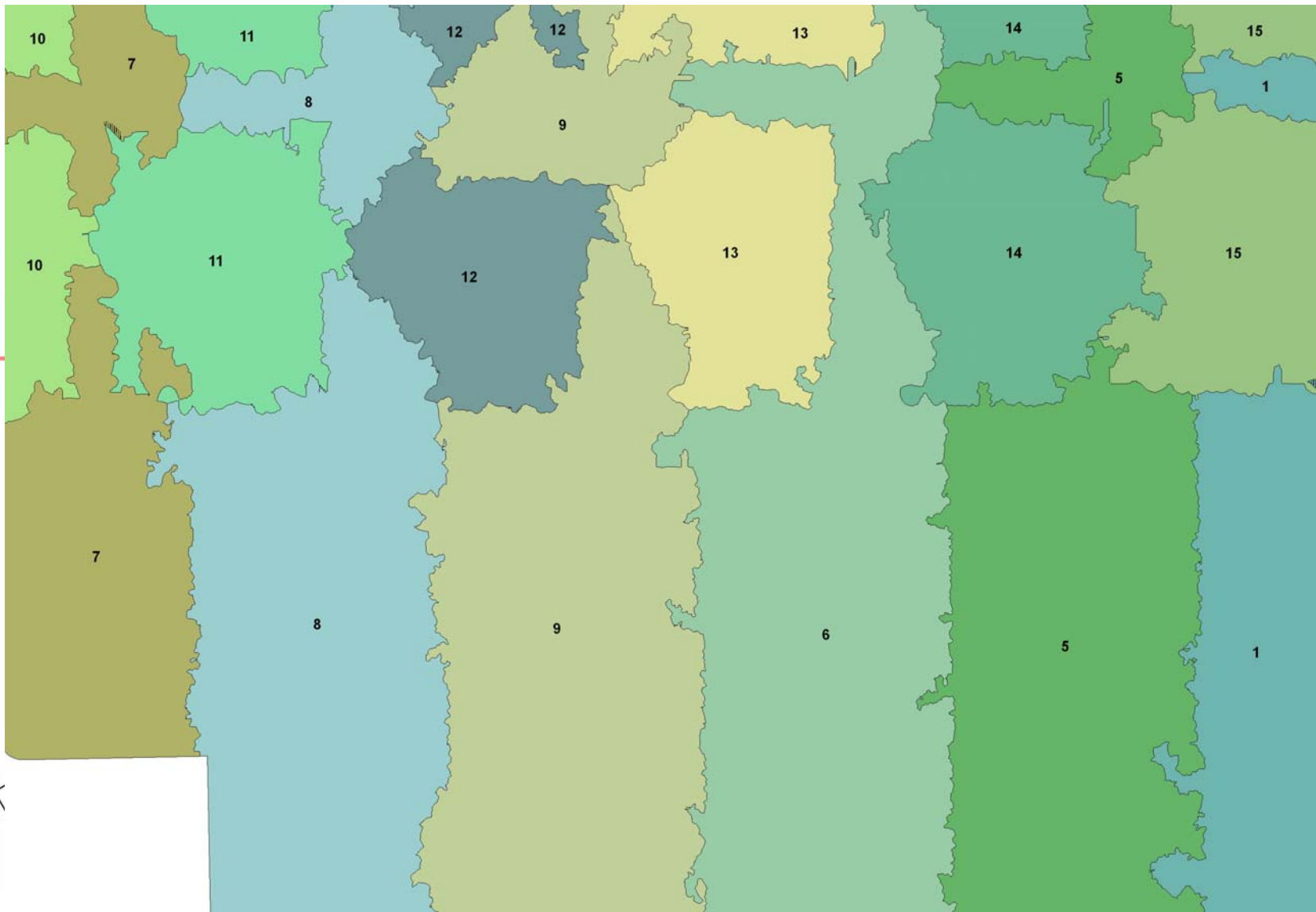


# Seamline Shapefile

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## ○ Errors

- **5** counties did not have adequate coverage
- **66** counties with overlap errors
- **48** counties with gap errors
- **36** counties with multi-part polygons
- **43** counties with polygons under 40,470 square meters



# 15 Polygons



# Absolute Control

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- Why absolute?
  - Less manipulation of vector data (CLU) over time to “match” base layer (imagery)
  - Imagery is used as a base layer in GIS
  - A more accurate dataset is a more valuable dataset over time
  - Doesn't use errors and offset from former imagery
  - Imagery would match most other data sets
  - Absolute accuracy is a better, more understandable specification



# Absolute Control

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- Migration from relative horizontal accuracy to absolute horizontal accuracy
  - Began as a pilot program
    - Utah in 2006; Arizona 2007
  - Working toward a nationwide photo-identifiable control database
    - Control points are strictly for the APFO QA of NAIP imagery
    - Points are not releasable to the general public

# Absolute Control

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- NAIP 2008 Control Point Acquisition
  - 7 states (IN, MN, NH, NC, TX, VT, VA)
  - Coordination in APFO Service Center Support Section
    - Began in January 2008
    - Telecons with local-level (FSA, USGS, and state-level) personnel to facilitate acquisition
  - Control points are received, checked, and data based at APFO



# Example Supplemental Data

o Current data base

• 8,646 total points

o Many of the points come with supplemental data

• Data Sources: USGS, NGS, State Agencies – TNRS, Minnesota DOT, NCGS, IndianaDOT, VirginiaITA

OPUS solution 98101701.DAT 000158277.txt - Notepad  
 File Edit Format View Help  
 From: opus@ngs.noaa.gov  
 Sent: Friday, June 22, 2007 8:18 AM  
 To: Emily Schad  
 Subject: OPUS solution : 98101701.DAT 0001

FILE: 98101701.DAT 000158277

NGS OPUS SOL  
 =====  
 USER: 667136000@state1.com  
 RINEX FILE: 98101701.076

SOFTWARE: page5\_0612.06 master10.pl  
 EPOCH: 1143 12.000 [rapid]  
 ANT NAME: TRM3429.004-GP NONE  
 ARP HEIGHT: 2.000

UTM COORDINATES STATE PLANE COORDINATES  
 X: -2109045.977(m) 0.003(m)  
 Y: -4725479.710(m) 0.019(m)  
 Z: 3278344.639(m) 0.004(m)

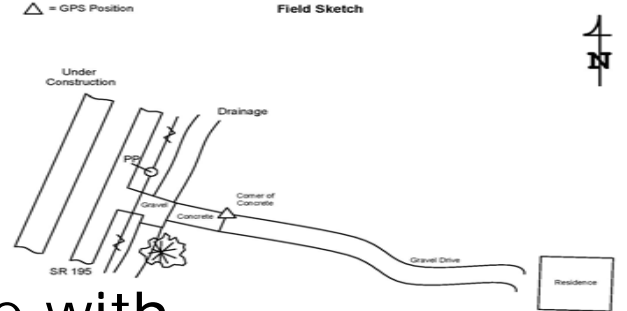
UTM COORDINATES STATE PLANE COORDINATES  
 X: 443 56 53.31230 0.003(m) 443 56 53.31230 U. UUY(m)  
 Y: 114 3 6.68770 0.009(m) 114 3 6.73601 0.009(m)  
 Z: 1208 375(m) 0.012(m) 1208 602(m) 0.012(m)  
 ORTHO HGT: 1206.15(m) 0.028(m) [Geoid] NAVD83

UTM COORDINATES STATE PLANE COORDINATES  
 UTM (Zone 11) SPC (0203 AZ W)  
 Northing (Y) [meters] 3974696.314 541301.679  
 Easting (X) [meters] 186116.653 186116.653  
 Combined Factor 1.00028306 0.99975272

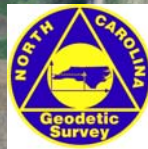
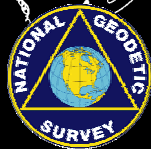
US NATIONAL GRID DESIGNATOR: 11SQV6614774606 (Quad 83)

BASE STATIONS USED  
 PID DESIGNATION LATITUDE  
 A11826 LVND LAS VEGAS VALLEY CORS ARP N360934.026  
 D11079 NVLM AMS WT FACILITY CORS ARP N360410.756  
 AM7015 KING KINGMAN CORS ARP N351150.480

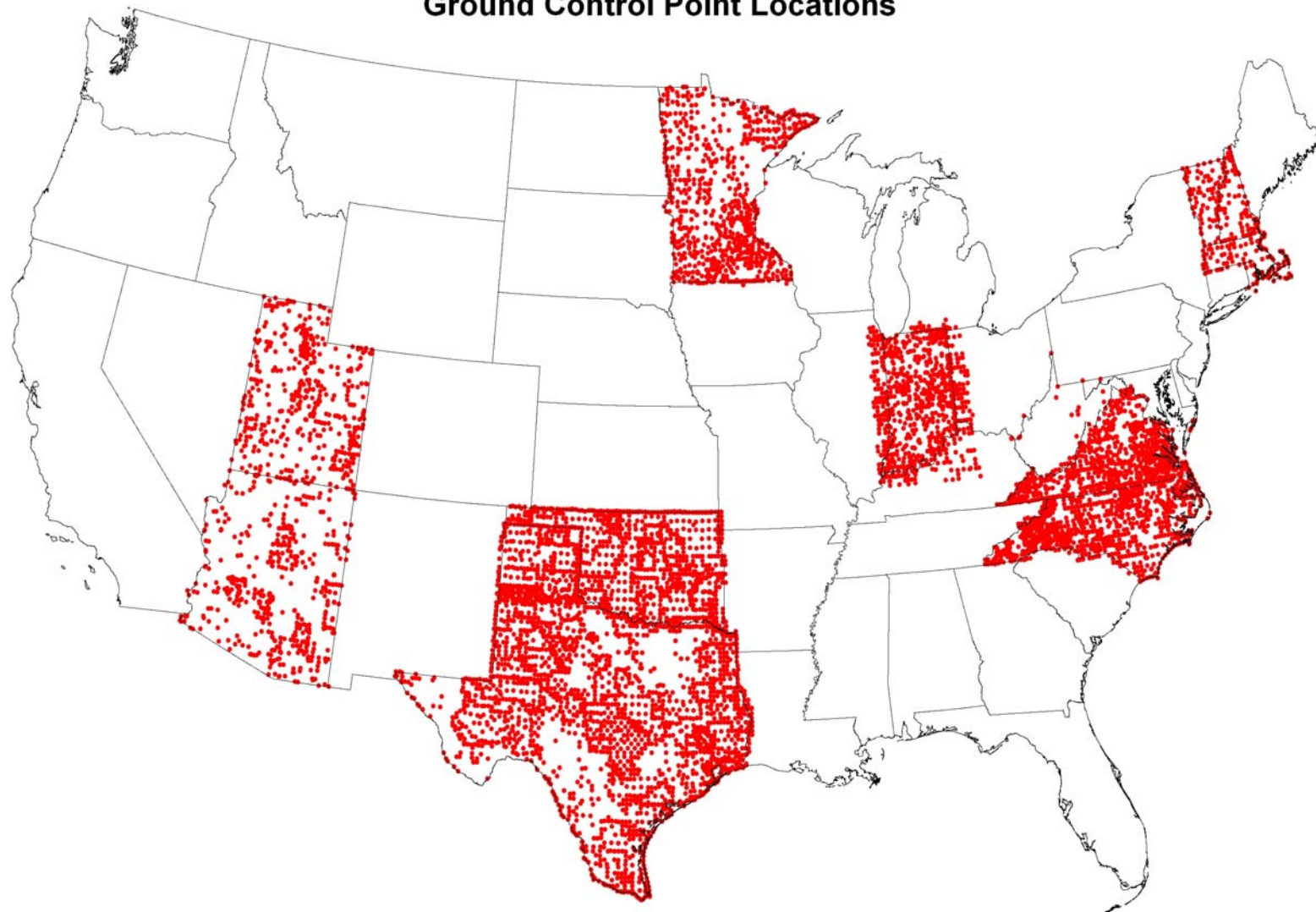
City of Killeen Photo Control Point	
Point ID: 602	Date Established: 04.03.06
NAD-83 Geodetic Position	NGVD 29 US Survey Feet
Latitude N: 30° 56' 22.08821	Elevation: 830.430
Longitude W: 97° 47' 11.47342	Ellip: 743.456
NAD-83 Texas State Plane Coordinates Texas Central Zone Meters	NAD-83 Texas State Plane Coordinates Texas Central Zone US Survey Feet
Y Coordinate: 3143882.014	Y Coordinate: 10314552.907
X Coordinate: 943335.096	X Coordinate: 3094925.226



(Drawing not to scale.)



## Ground Control Point Locations





# Absolute Control

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- NAIP 2009
  - All states will be absolute control
  - Coordination will again be in APFO Service Center Support Section



# NAIP Survey

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- Purpose
  - Excellent measure of how well NAIP is serving the customer
  - Gives FSA a chance to respond with concerns, satisfaction, etc.
- NAIP 2008 survey should be released February 2009
- Results of 2007 survey are available
  - <http://www.apfo.usda.gov/>
  - Click on "Imagery Programs", then "NAIP Survey"