

NDOP Technical Subcommittee Report

Boulder, CO

October 8, 2008

Topics

- NDOP Technical Subcommittee Meeting
- IFTN QA/QC and Hosting and Archiving
- IFTN 1-meter CONUS
- IFTN 1-meter Alaska
- IFTN 1-meter Insular & Territories
- IFTN High Resolution
- Recommendations & Comments
- NDOP Technical Subcommittee 2008-09

NDOP Tech Meeting

- NOAA Coastal Service Center Charleston, SC
 - September 10-11, 2008
 - Hanna and Ike
- IFTN Technical Issues
 - QA/QC Issues
 - Archive & Distribution (Hosting & Archiving)
 - 1-meter and High Resolution Specifications
 - NAIP Attachment C, Template for IFTN Specifications
 - Schedule Oct 1 Draft, Dec 31 (or sooner) Final
- IADIWG Meeting Sept 8-9, 2008
 - George, Russ, Tony, David on NDOP & IADIWG
 - IADIWG Quality Assurance Study

IFTN Technical Specifications

- Draft document will be placed on the NDOP website or ask for a copy this week
- This is a draft, please provide comments

IFTN QA/QC

- Existing NAIP inspection
- Existing USGS Urban Area inspection
- State and local inspection methods
- Common standards and procedures
- Input from IADIWG Quality Assurance

IFTN Hosting & Archiving

- Existing USDA, USGS, other infrastructure
- Data estimates 1-meter
 - ± 203,600 DOQQs
 - 4-band
 - CONUS, PacBasin, PR, USVI
 - 39 Tb/year (Orthos only - Does not include raw imagery)
- High Resolution
 - TBD
- Additional Information from the Hosting & Archiving Working Group

IFTN 1-meter CONUS

- CONUS
- PR, USVI (same specs but 3 year cycle)
- Expanded NAIP specifications

- Buy ups or options
 - CIR or 4-band (4-band standard? NDOP Tech recommendation)
 - Increased horizontal accuracy (NDOP Tech recommends removing this option)
 - 1/2 meter GSD?

IFTN 1-meter Alaska

- The NDOP Technical Subcommittee waiting on the AGDC-SDMI DEM Report and other input for specification guidance
- Does NDOP/FGDC include the acquisition of DEM's to IFTN for Alaska? Updated DEM's would be required for orthoimagery that meets NMAS at 1:24K
- Should the NDOP Technical Subcommittee include a representative or increased input from the AGDC to help define the Technical Specifications for Alaska?
- The NDOP Technical Subcommittee will issue Draft Specifications recommendations for Alaska at the Spring 2009 NDOP meeting

IFTN 1-meter Insular & Territories

Cost Benefit Analysis

Original IFTN Concept - 1-Meter (Enhanced NAIP – USDA managed)

- Acquired annually over lower 48
- HI and insular areas on 3 year cycle*
- Alaska on 5 year cycle (USGS)
- Limited buy-up options

* Insular areas include Pacific Basin, Puerto Rico and Virgin Islands



Satellite Orthoimagery History

- **USDA has been acquiring Digital Orthoimagery data in Hawaii since the 1996.**
- **USDA-NRCS issued a contract for Satellite data in the Pacific Basin (Guam) in 2003.**
- **USDA-NRCS started in 2005, using Satellite contracts with USGS, USDA-FAS and the Hawaii Ikonos Consortium to acquire large areas of Hawaii and the Pacific Basin.**
- **As of today, USDA has collected Satellite Imagery for most of Hawaii and the Pacific Basin.**



NDOP Technical Subcommittee Meeting Charleston, South Carolina

- **NDOP Technical Subcommittee worked on two versions of IFTN Satellite Specifications**
 - Hawaii
 - Pacific Basin
- **NDOP authored Satellite Specifications were submitted to USGS and NOAA for comment.**
- **Overall comments were very positive. Original specifications have been updated based on USGS and NOAA input.**
- **The NDOP Technical Subcommittee will submit the final approved Draft Specifications to state GIS committees such as the Hawaii Geographic Information Coordinating Council**



Draft IFTN Specifications for Satellite Imagery for Hawaii

10/2/2008

Islands = Niihau, Kauai, Molokai, Maui, Lanai, Kahoolawe and Hawaii

Statement of Deliverables. A list of the quarter quadrangles and a coverage diagram are shown in **Attachment A**. The products will consist of 1 meter or higher resolution, four color bands (R/G/B/IR) satellite imagery orthorectified products delivered in DOQQ naming convention and format.

- a. The vendor shall deliver Satellite Imagery for the project area that conforms to the following requirements:
 - i. **Pixel Resolution:** The horizontal ground resolution or ground sample distance (the area of the ground represented in each pixel in x and y components) shall be nominally 1 meter or higher resolution. Pixel re-sampling is forbidden. Imagery must be delivered at native collected image resolution. Image resolution must be consistent over an entire area of interest such as an island. Vendor should strive to collect an archipelago at the same image resolution when possible.
 - ii. **Geo-referencing:** UTM Projection, GRS1980 Spheroid, NAD83 Datum, UTM Zone 4 (Maui, Lanai, Molokai, Kahoolawe) or 5 (Hawaii), with coordinates in meters.
 - iii. **Band Combination:** Two data products will be required for delivery.
 - Four Color bands (R/G/B/IR) and Pan band delivery in 16 bits per pixel. Non Pan Sharpen Product delivered by single band per GeoTIFF file for NOAA.
 - Four Color bands (R/G/B/IR) Pan-Sharpended imagery with a dynamic range of 16 bits per pixel. Pan Sharpen Product for NRCS. Product will be delivered in the following band order: Bands 1 = Red, 2 = Green, 3 = Blue, 4 = Infrared.
 - iv. **Re-sampling Parameter:** Pan-Sharpending Kernel
 - v. **Imagery Characteristics:** The final imagery products shall be made from the most recent archived imagery or new tasking if archive imagery does not meet IFTN specifications. Imagery maximum off NADIR angle should be 10 degrees or less in urban areas. Areas with topographic relief (Mountains and Canyons) must be less than 20 degrees or less off NADIR angle. Exceptions to this specification must be approved by USGS/NOAA/NRCS.

Draft IFTN Specifications for Satellite Imagery for Pacific Basin

10/3/2008

Statement of Deliverables. The products will consist of 1 meter or higher resolution, four color bands (R/G/B/IR) satellite imagery orthorectified products delivered in DOQQ naming convention and format for Guam and by vendor defined tile for all other islands.

- a. The vendor shall deliver Satellite Imagery for the project area that conforms to the following requirements:
 - i. **Pixel Resolution:** The horizontal ground resolution or ground sample distance (the area of the ground represented in each pixel in x and y components) shall be nominally 1 meter or higher resolution. Pixel re-sampling is forbidden. Imagery must be delivered at native collected image resolution. Image resolution must be consistent over an entire area of interest such as an island. Vendor should strive to collect an archipelago at the same image resolution when possible.
 - ii. **Geo-referencing:** UTM Projection, WGS84 Spheroid, WGS84 Datum with coordinates in meters.
 - iii. **Band Combination:** Two data products will be required for delivery.
 - Four Color bands (R/G/B/IR) and Pan band delivery in 16 bits per pixel. Non Pan Sharpen Product delivered by single band per GeoTIFF file for NOAA.
 - Four Color bands (R/G/B/IR) Pan-Sharpended imagery with a dynamic range of 16 bits per pixel. Pan Sharpen Product for NRCS. Product will be delivered in the following band order: Bands 1 = Red, 2 = Green, 3 = Blue, 4 = Infrared.
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NDOP Recommended High Level Satellite Specifications

- Pixel Resolution is One Meter or Higher GSD
- Pixel Re-sampling to One Meter is forbidden in Hawaii/Pacific Basin
- At least Four Band Acquisition is required.
- Cloud cover at 5% or less or land areas. Shorelines, Urban and Agricultural areas are highest priority for cloud free coverage.
- Two products delivered
 - Pan-Sharpen Product (USDA/USGS/States)
 - Non-Pan Sharpen Product by Band (R/G/B/IR/Pan)



Satellite License Options for Hawaii, Pacific Basin and Alaska?

From most to least desirable....

- 1) Public Domain**
- 2) Public Domain minus 3rd Party Commercial Sales**
- 3) Public Domain after agreed time period (aka Sunset clause), similar to Aerial Express for USGS/DHS.**
- 4) Unlimited use license by all Federal (Civil, Defense), State, Local Governments and cooperators such as Universities and land owners.**



Puerto Rico and the US Virgin Islands

- **Specification for Imagery Acquisition will be similar to the Continental US.**
- **USACOE and USDA have recent contracts for Aerial Camera acquisition.**
- **Imagery Acquisition in Puerto Rico has been successfully with the exception of cloud coverage in the mountains.**
- **Successful acquisition occurs in the Fall and Winter time periods.**
- **More information including Technical Specifications will be done by the Spring 2009 NDOP meeting**

IFTN High Resolution

- 1-ft & 6-in standard products “draft” specifications - Guidelines for Acquiring Imagery for the Nation Orthoimagery - Appendix 2 High Resolution Description and Specifications available for comment
 - Outstanding Issues
 - Tiling Schemes
 - Coordinate Systems
 - Naming Conventions

Technical Sub-Committee

Clarifications

- Buy-up costs cover more than production – also cover QA/QC, archiving, and distribution costs.
- 1-meter specs apply to Puerto Rico and Virgin Islands, but on a 3-year cycle.

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Questions

- Standard IFTN Deliverables
 - Is the CCM included within 1-m USDA deliverables?
 - Should the High Resolution Orthos offer CCMs?
 - Should all products be metric? Ex., 1ft or .3m?
 - Which buy-ups are for increased footprints?
 - Which buy-ups are replacing the base product, and which are in addition?
- Should there be a buy-up for a ½ meter ortho within the USDA 1-meter program and if so, should we allow a higher spatial accuracy in the State Plan?
- With “redundant” versions of imagery, which version(s) go through IFTN review, archiving and distribution?
- Does the 1ft product footprint change if there is a buy-up to 6”? In other words, because it is 6”, does the footprint change to Census Urbanized Areas, or stay 1/2 state at 6”?
- What’s the minimum mapping unit for buy-ups?
- Who reviews/approves/denies business plan? NDOP Technical Sub-Committee? Federal Program Stewards? FGDC?

Technical Sub-Committee

Recommendations

- Non-Ortho IFTN deliverables
 - Raw image index
 - Raw imagery
 - Stereo-imagery
 - GCPs
 - Elevation Models
- All digital systems that use “pan-sharpened” algorithms shall not have a panchromatic to color GSD ratio greater than 1:5. **Does this ratio cover satellite ratios?**
- If CIR buy-up requested, must be a 4-band digital sensor acquisition.
- Only digital sensors with a USGS/IADIWG Manufacturer’s Certification to be used.
- Remove 1-ft buy-up option 5 (sample to lower resolution).
- True-ortho option should be expanded to include all areas, not just urban.
- Suggest language waiving “public domain” for satellite imagery requirement for Alaska, Hawaii, and Pac Basin.

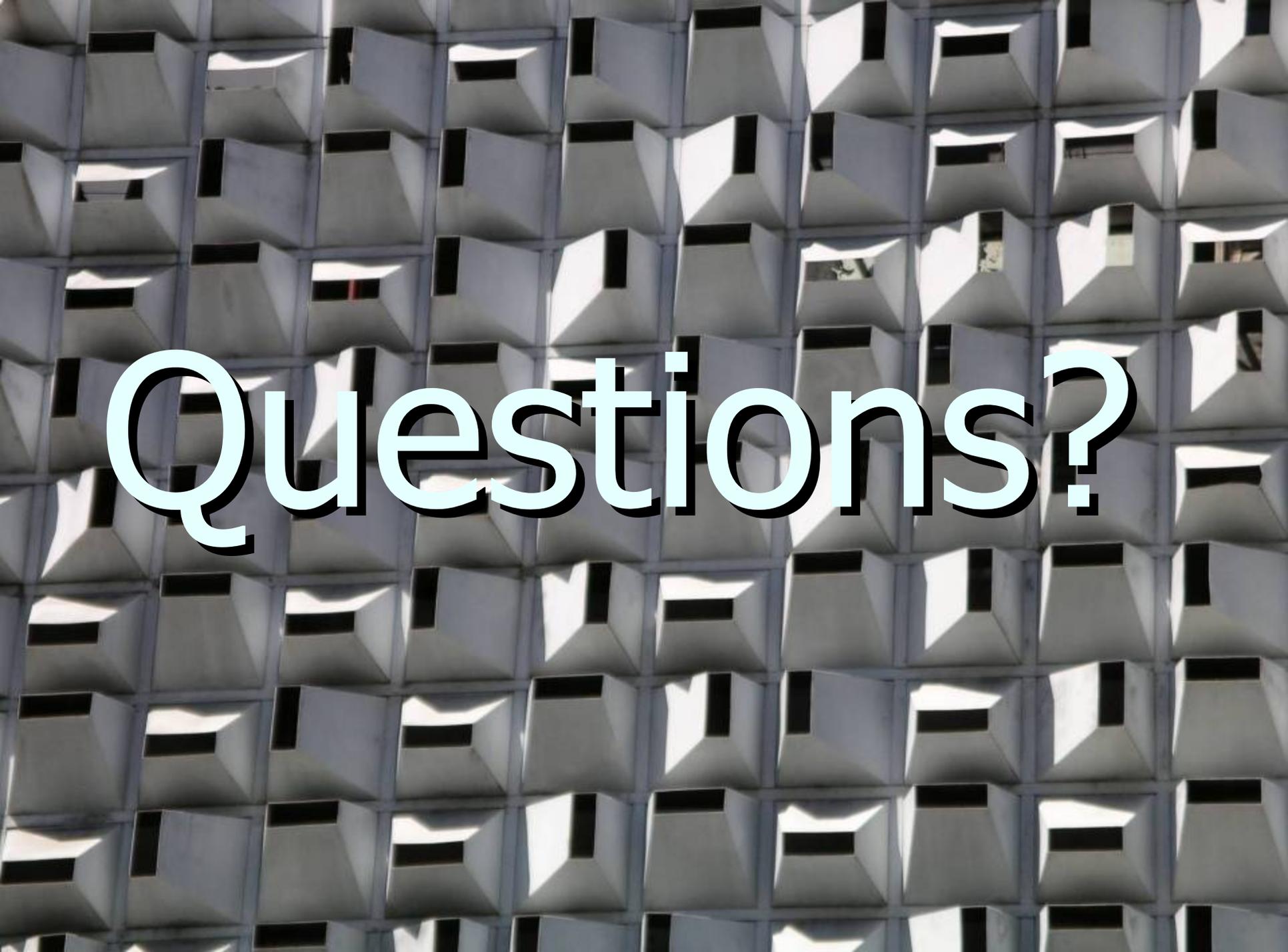
Technical Sub-Committee

Recommendations

- 4-band imagery should be captured at least once every 3 years.
- All buy-up options must be stated in a State Plan. Multiple plans within one state not allowed.
- Buy-ups not allowed to delay delivery of base-products.
- Buy-ups cannot degrade any aspect of the base product. Ex., horizontal accuracy of a 6" buy-up from 1ft cannot be less accurate than the 1ft standard product.
- All plans within a state (tribal, state, local, federal) must be part of the State Business Plan.
- State Business Plans will not only provide all funding for buy-ups but will also provide detailed technical specifications for those buy-ups.
- NSGIC membership to provide all ortho related datasets for all states.
- NDOP TC may provide buy-up templates that must be used in the State Business Plans.
- 1 meter or better GSD for Hawaii, Insular Areas, and Territories

2008-2009 Technical Sub-Committee

- Finalize IFTN Specifications
- Continue supporting NDOP & IFTN issues
- Continued research
 - Multi & Hyperspectral
 - Elevation, DEM, control issues
 - Satellite & other platforms
 - Formats (state/national datums, data, etc)
 - 3-D Orthos (Bare-earth & Multiple Surface)
 - Others



Questions?