

1:14400 43-4-57N 079-04-22W 004-00

2009 NAIP SEASON POST MORTEM

California, Montana, Washington



NORTH WEST GROUP



Team



NORTH WEST GROUP

▣ North West:

- Contract management
- Project management
- Acquisition (61%)
 - 4 Cessna Conquests
 - 4 ADS80's
- Ingest QC
- Data archival
- Processing
- Delivery
- Warranty fulfillment

▣ Fugro:

- Acquisition (39%)
 - 3 Cessna Conquests
 - 4 ADS40's
- ▣ Due to limited award Fugro did not perform any processing

7th consecutive season with the same team

Control



NORTH WEST GROUP

- Early communication on awards is key to not cause delivery delays
- We retained the services of CompassData for control in 2009
 - Combination of existing points and newly established for us
 - Had to pay the “expedite” fee for quick delivery to meet the USDA delivery schedule
 - The downside is this is licensed control
 - We can not distribute it
 - Others can license it in subsequent years
 - Very happy with the service they provided
- Washington DNR also donated some control to improve accuracy
- Shared our 2008 control (unlicensed) with another contractor
 - (Craig owes us dinner)

Processing improvements 2009



NORTH WEST GROUP

- In our internal 2008 year end retrospective one of the action items we wanted to really improve was our initial data validation
 - We call this step Data Ingest (DI in NWG geek-speak)
 - We set a goal of doing this in 24 hours (or less) from data arriving
 - The goal was to process the data “far enough” that we knew for certain we could deliver product to meet the USDA specs. “far enough” is a slippery slope. Turned out to be “take it to final ortho using GPS/INS and do a coarse mosaic
 - Everything is taken to 4-band ortho for inspection to ensure no problems
- This process worked really well and met the goals with the exception of a few long weekends where due to Fedex delays we would get 3 or 4 days of data at once.

Processing Improvements 2009



NORTH WEST GROUP

- The other process we worked on automating was the USDA radiometric specs
 - The process above to QC the data allowed us a unique option!
 - From the QC images we capture radiometric statistics for clipping, histogram peak, contrast, and some other metrics
 - We wrote a tool that uses these radiometric stats to compute correction curves for each flight line in a CCM or cluster of CCM (CCCM.) The correction computed shifts the average for the CCM/CCCM to the middle of the USDA specs
 - When we make the final L2 ortho strips these corrections are applied
 - The only downside is in some areas like south-east CA where all desert some fiddling has to happen or larger CCCM blocks processed at once
 - Process worked well – we had a lot less issues meeting USDA specs and virtually removed all the human fiddling

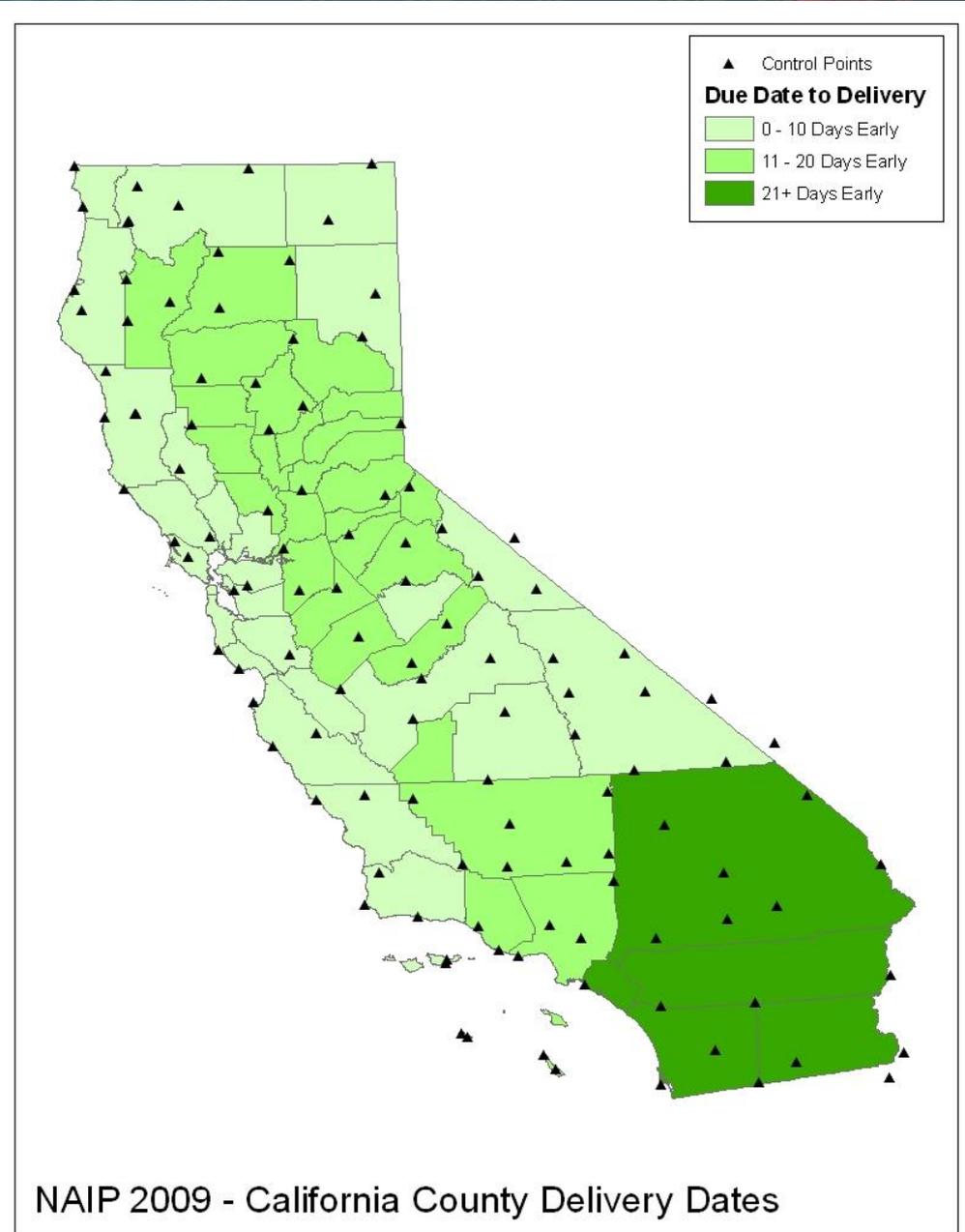
California acquisition

- ❑ Divided into 4 seasons
- ❑ 58 counties, 11080 DOQQ's
- ❑ Late award – on site 3 days after award
- ❑ 220 aircraft days on site
- ❑ 57 days with suitable weather,
- ❑ 84 acquisition flights
- ❑ 269 flight acquisition hours
- ❑ Extension required in season 1+2 due to marine fog
 - ❑ “June gloom”
 - ❑ Season 1 extension to capture 2 islands
 - ❑ SUGGESTION: Considering splitting islands into separate CCM's
 - ❑ Season 2 extension just to capture coastal areas – all inland counties completed prior to request for extension.
- ❑ Snow in seasons 3 and 4 delayed acquisition
 - ❑ USDA gave a “all snow ok date”
- ❑ Partial coverage on 2 CCM's due to waiting on USAF approval of imagery for public release
- ❑ 48.4TB raw data collected



California processing

- ❑ 1180 hours of human time:
 - ❑ 11 minutes/DOQQ
- ❑ 5282 hours of computer time:
 - ❑ 48 minutes/DOQQ
- ❑ 220 control points used in CA
- ❑ Product RMSE 1.72m
- ❑ 71% CCM's delivered early
- ❑ 29% CCM's delivered on extended due date – all coastal
- ❑ Up to 51 days early

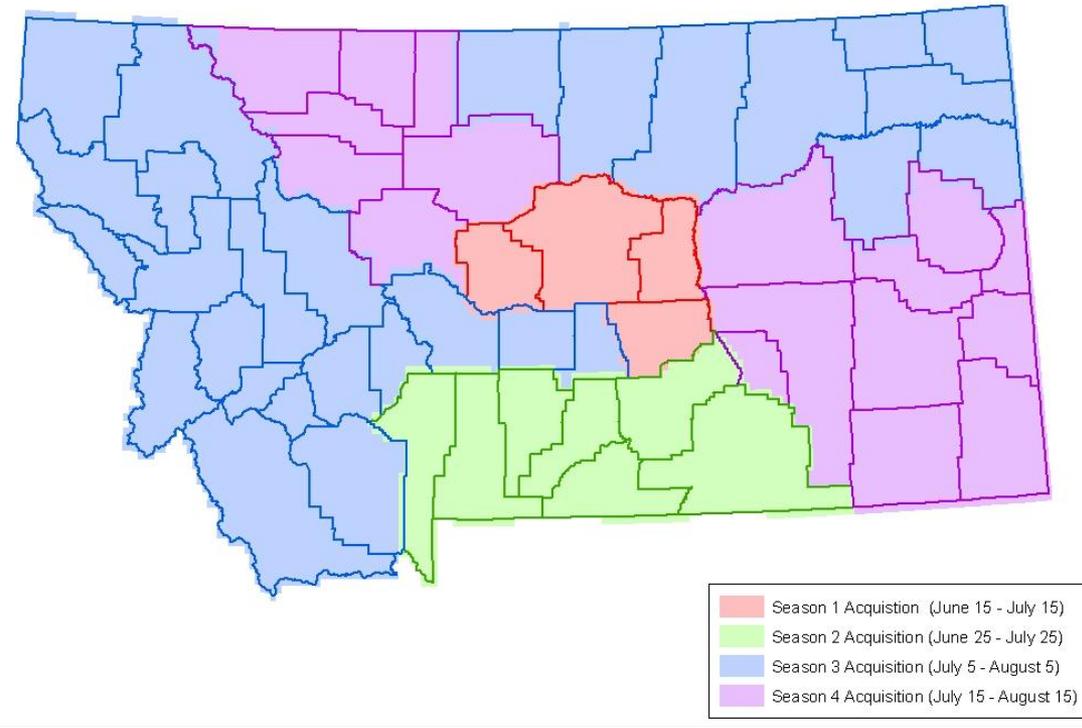




Montana acquisition

- ❑ Divided into 4 seasons
- ❑ 56 CCM's, 11793 DOQQ's
- ❑ 178 aircraft days on site
- ❑ 48 days with suitable weather
- ❑ 63 acquisition flights
- ❑ 233 flight acquisition hours
- ❑ Extensions in season 2, 3, 4 due to snow, fires, and weather
- ❑ 41.9TB raw data collected

NAIP 2009 - Montana Flight Dates

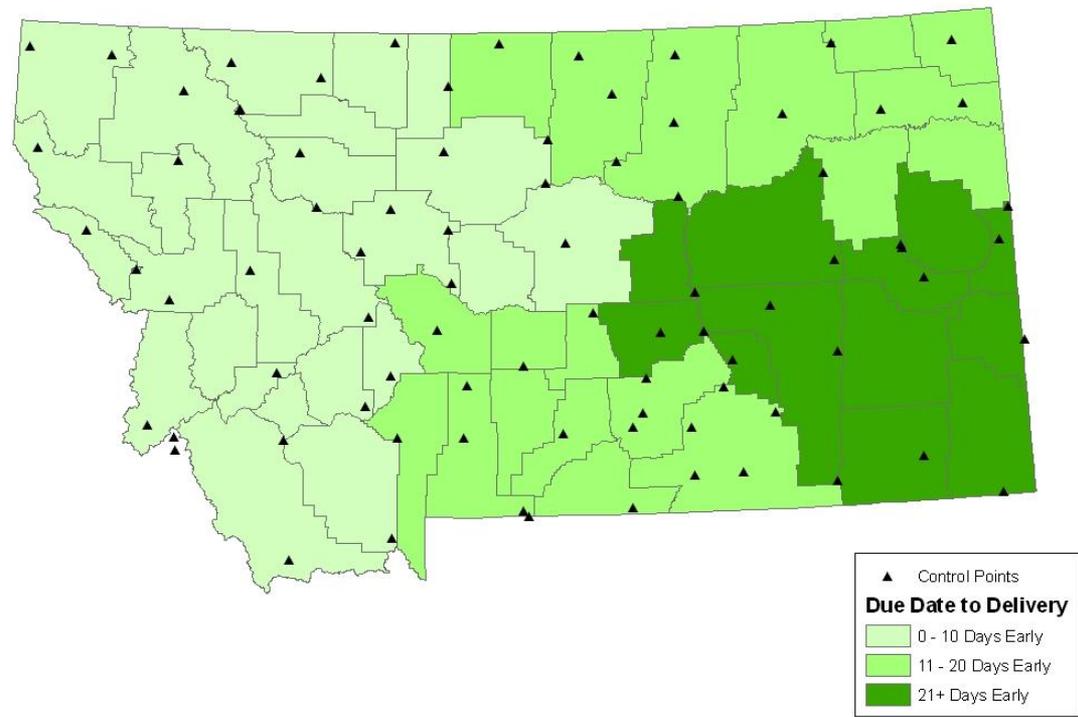




Montana processing

- ❑ 1039 hours of human time:
 - ❑ 8 minutes/DOQQ
- ❑ 4885 hours of computer time:
 - ❑ 41 minutes/DOQQ
- ❑ 152 control points used in MT
- ❑ Product RMSE 1.42m
- ❑ 100% CCM's delivered early
- ❑ Max: 38 days early

NAIP 2009 - Montana County Delivery Dates

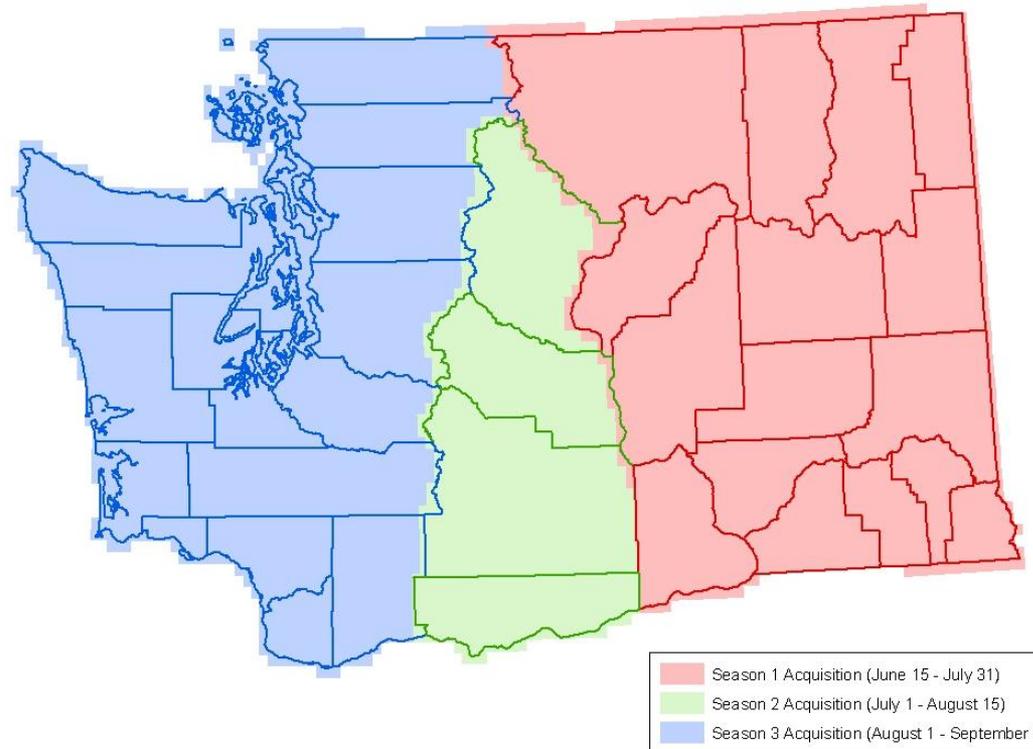




Washington acquisition

- Divided into 3 seasons
- 39 CCM's, 5718 DOQQ's
- 41 aircraft days on site
- 18 days suitable weather
- 27 acquisition flights
- 88 flight acquisition hours
- No extensions required
- 15.8TB raw data collected

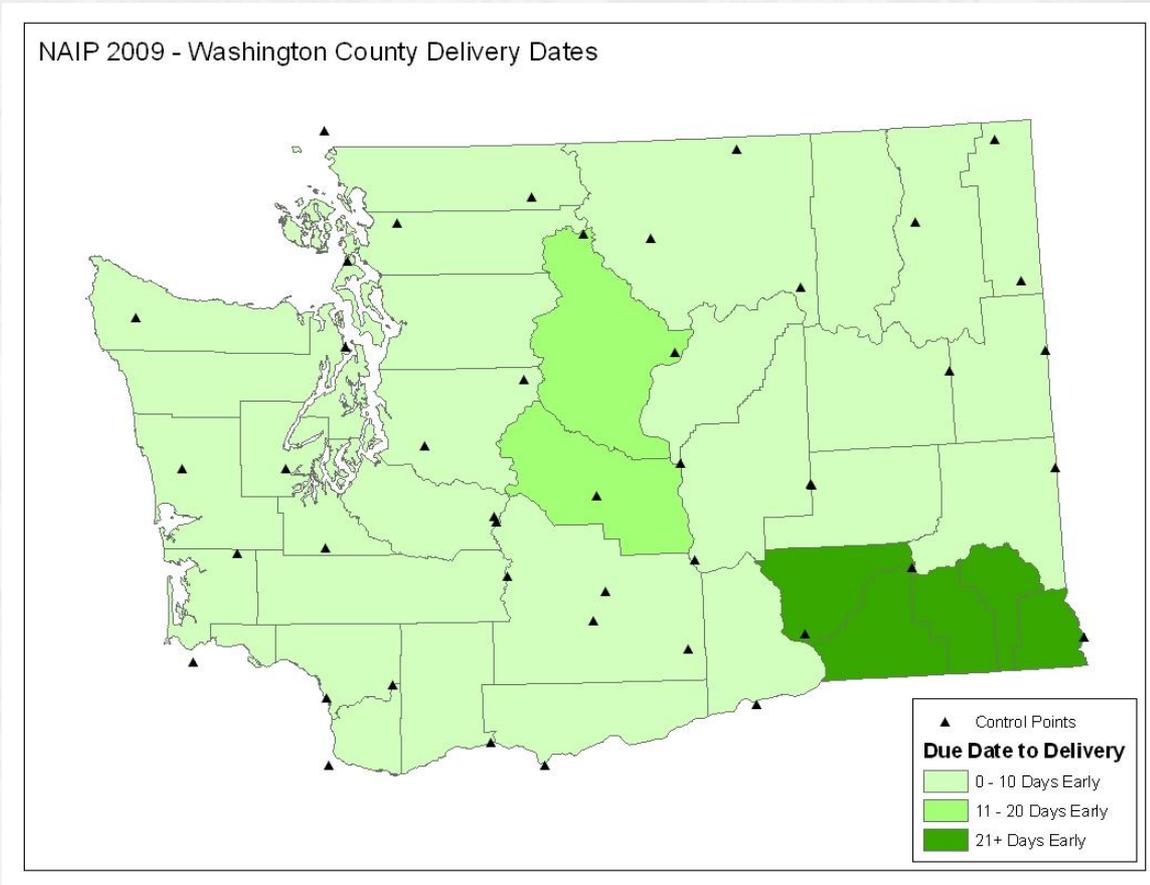
NAIP 2009 - Washington Flight Dates





Washington processing

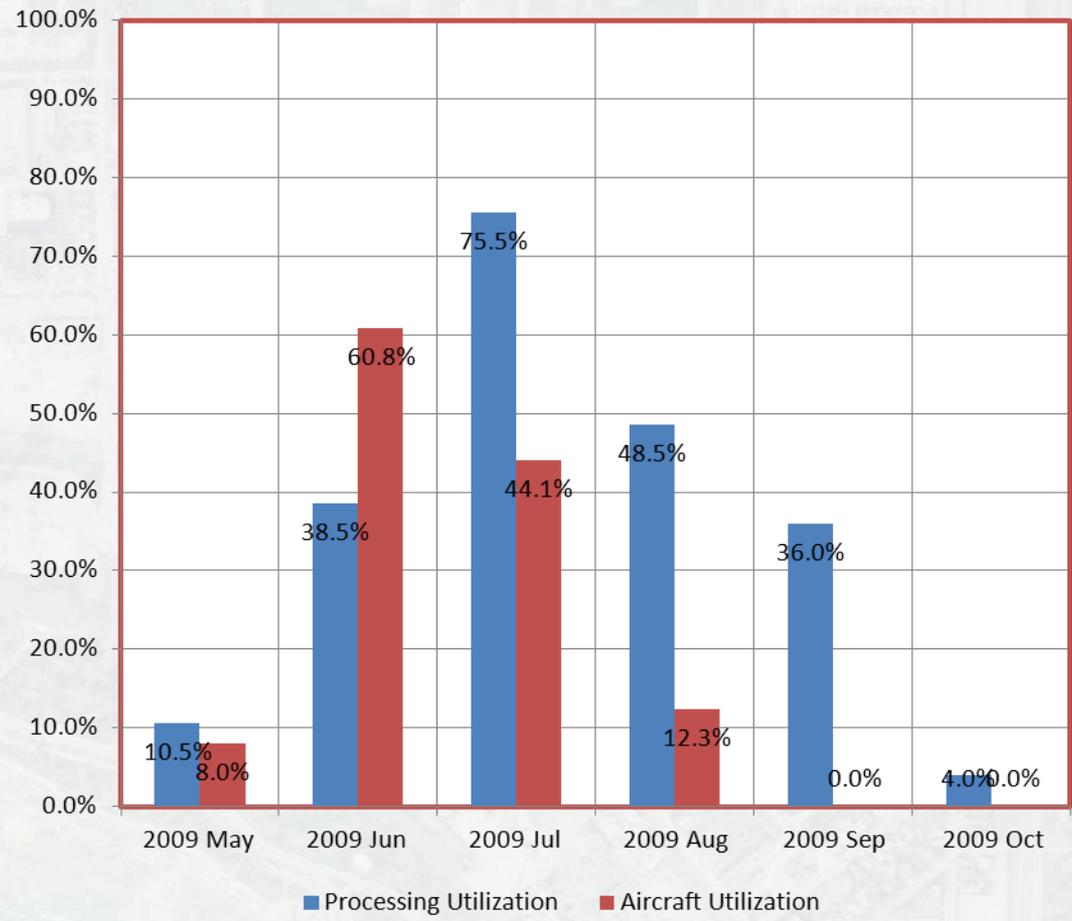
- 509 hours of human time:
 - 9 minutes/DOQQ
- 2328 hours of computer time:
 - 41 minutes/DOQQ
- 130 control points used in WA
- Product RMSE 1.60m
- 100% of CCM's early
- Max 24 days early





Resource Utilization

- Aircraft utilization based off 50% days having good weather
- Processing utilization is based off actual staff hours available
- Acquisition peaked at 60.8% in June with CA, MT and WA all open
- Processing peaked at 75.5% in July
- One additional state in May-June could have been handled
- Additional states in July and later could have been handled



DSM



NORTH WEST GROUP

- Internally developed DSM engine for ADS80
- Using algorithms from the machine vision domain and not photogrammetry
- Estimate about \$20.00/DOQQ for a new DSM for ortho production
- Ready for a statewide pilot in 2010

San Diego Conference Center

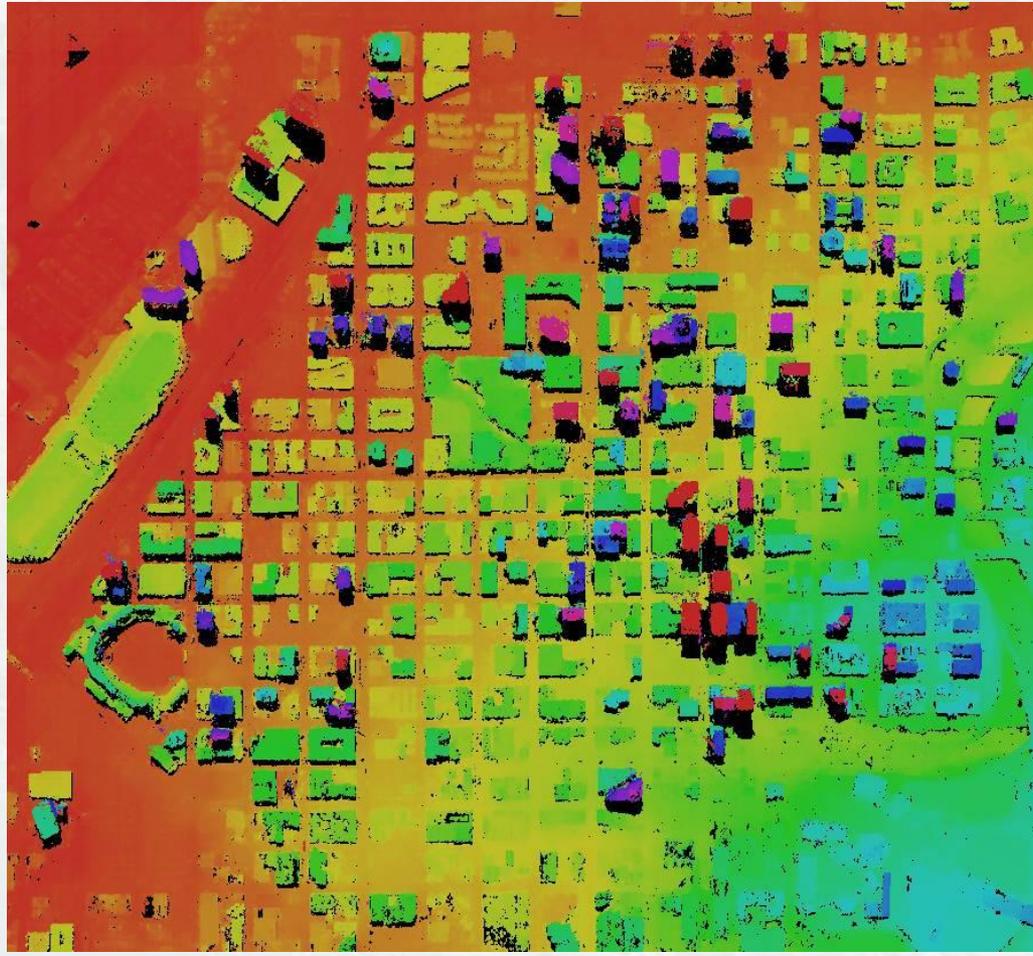


NORTH WEST GROUP



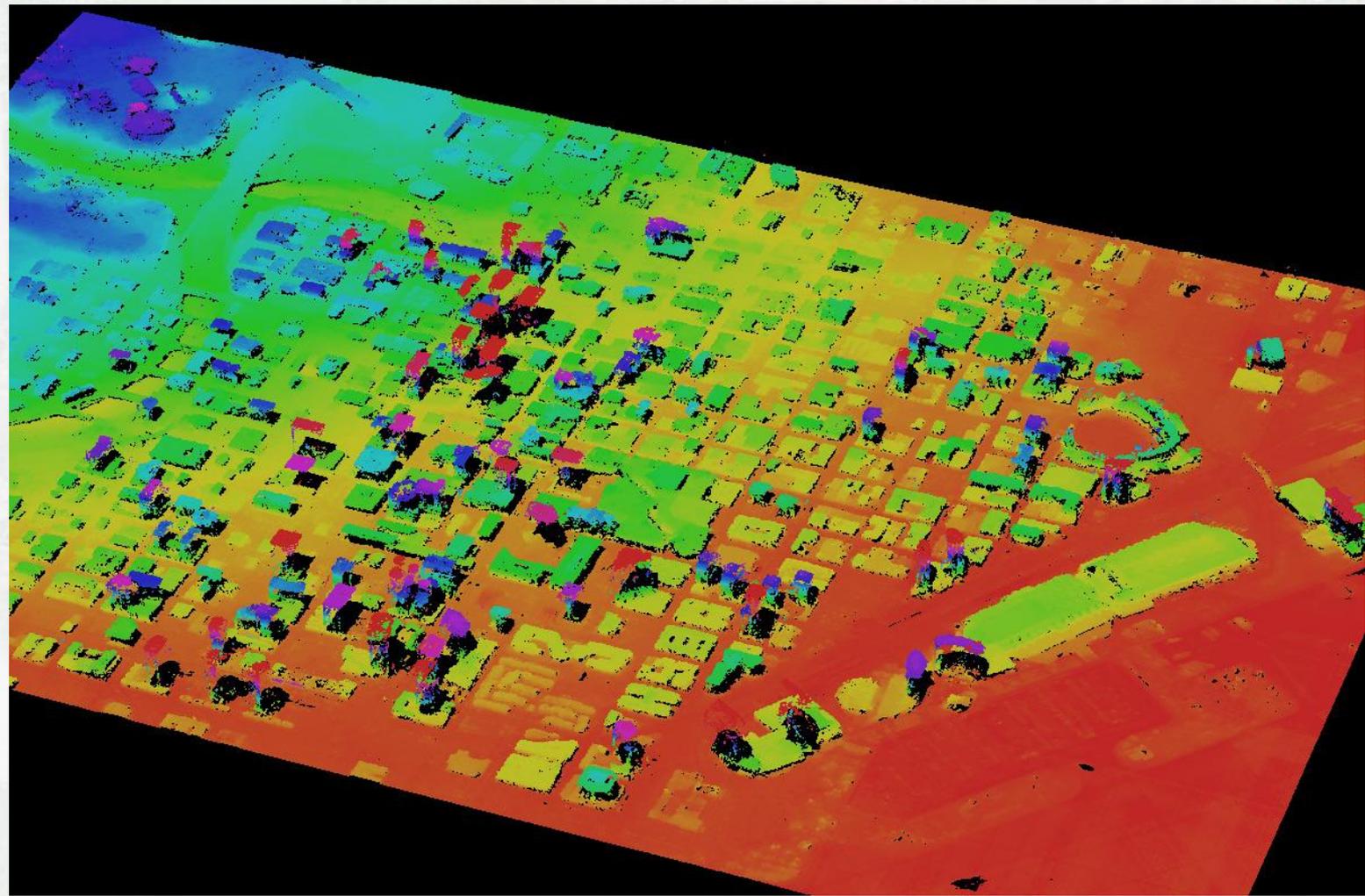


1m DSM – no cleanup



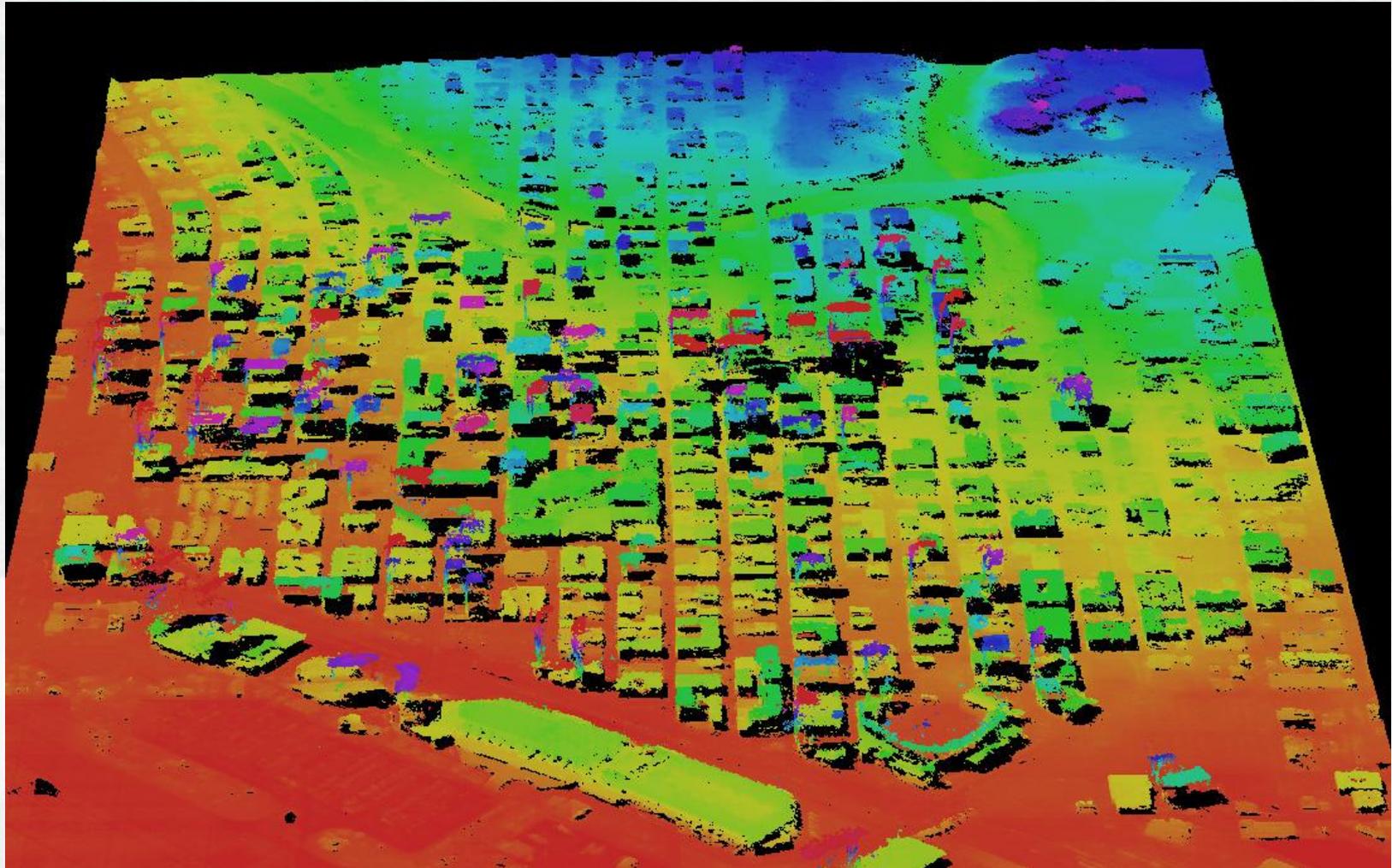


1m DSM – no cleanup





1m DSM – no cleanup



Resale's



NORTH WEST GROUP

- TX 2008 reprocessed to 0.5m using hires mode and delivered. Great product!
- WA 2009 4 band stereo delivery
- CA 2009 4 band stereo delivery

Program improvements for 2009



NORTH WEST GROUP

- The bi-monthly calls were a great idea. Allowed a easy method to get closure on any open issues
- Hard drives for delivery of DOQQ's was a great improvement
- Switch back to CCM 3 band and 4 band DOQQ's was early enough to not be a serious impact

Program suggestions for 2010



NORTH WEST GROUP

- Consider award of same states to a vendor:
 - Some cost savings gained as control can be reused (~3%)
 - Especially relevant with “licensed” control
 - No DEM ‘surprises’ during tight timelines
 - Better able to negotiate resale opportunities early enough to impact NAIP pricing
- Isolating difficult lower priority weather areas into separate seasons and separate CCM’s to not hold up delivery of priority areas (CA islands as an example)

Questions?



NORTH WEST GROUP

- For more info please contact:

John Welter (john.welter@nwgeo.com)

Tim Crago (tim.crago@nwgeo.com)

- Thanks for your time!