

Alaska High Altitude Aerial Photography (AHAP): Transitioning Alaska's Legacy Data to the GIS Age



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- Provided coverage of 95% of the state of Alaska
- State/ Federal project 1978-1986
- 1:60,000 color infrared (CIR) photography
- 10% or less cloud cover photographed from high altitude U-2 and ER-2 aircraft
- Scaled to fit the U.S. Geological Survey Topographical Map Index
- Archived at UAF Geo Data Center (GDC)
- Data 30 years old yet still the most comprehensive high resolution imagery data set of Alaska
- Known distortions associated with aerial photography

Orthorectification Process

Project Definition

Import images

Define fiducial locations and camera data

Collect Ground Control Points (GCPs)

*Collected using a reference orthoimage and reference DEM

Bundle Adjustment

Calculate orthoimage

*Use reference DEM for ortho calculation

Ortho Procedure Reference Data

High-resolution orthoimage and DEM from the Advanced Land Observing Satellite (ALOS) PRISM sensor was used

2.5m orthoimage

5m DEM

PRISM provided the highest resolution DEM available for the orthorectification. As the ortho process is highly dependent on DEM resolution and accuracy, we feel this contributed greatly to the quality of the result

Past AHAP uses

Identification of diseased tree stands

Monitoring shoreline changes

Charting vegetation regrowth after fire

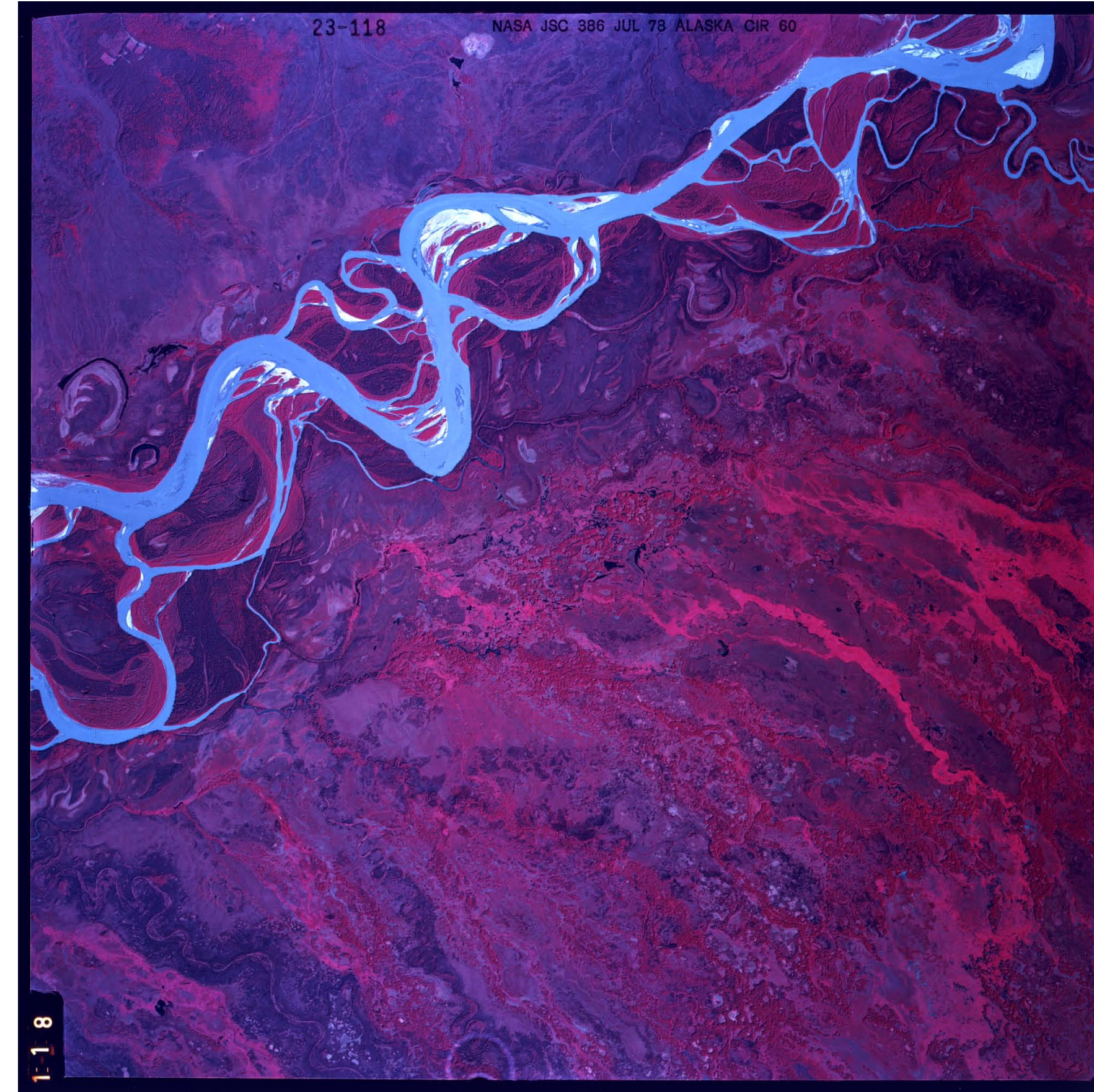
Delineating transportation corridors

Making land conveyance determinations

Other environmental changes

Summary

- *AHAP data are being digitized and orthorectified using best available ground control and DEMs
- *PCI Orthoengine has proved to be a good tool for the orthorectification process
- *Initial results have been very promising, with CE90 of approximately 12m in areas with accurate geodetic control
- *Results will be available through GINA and GeoData Center at UAF

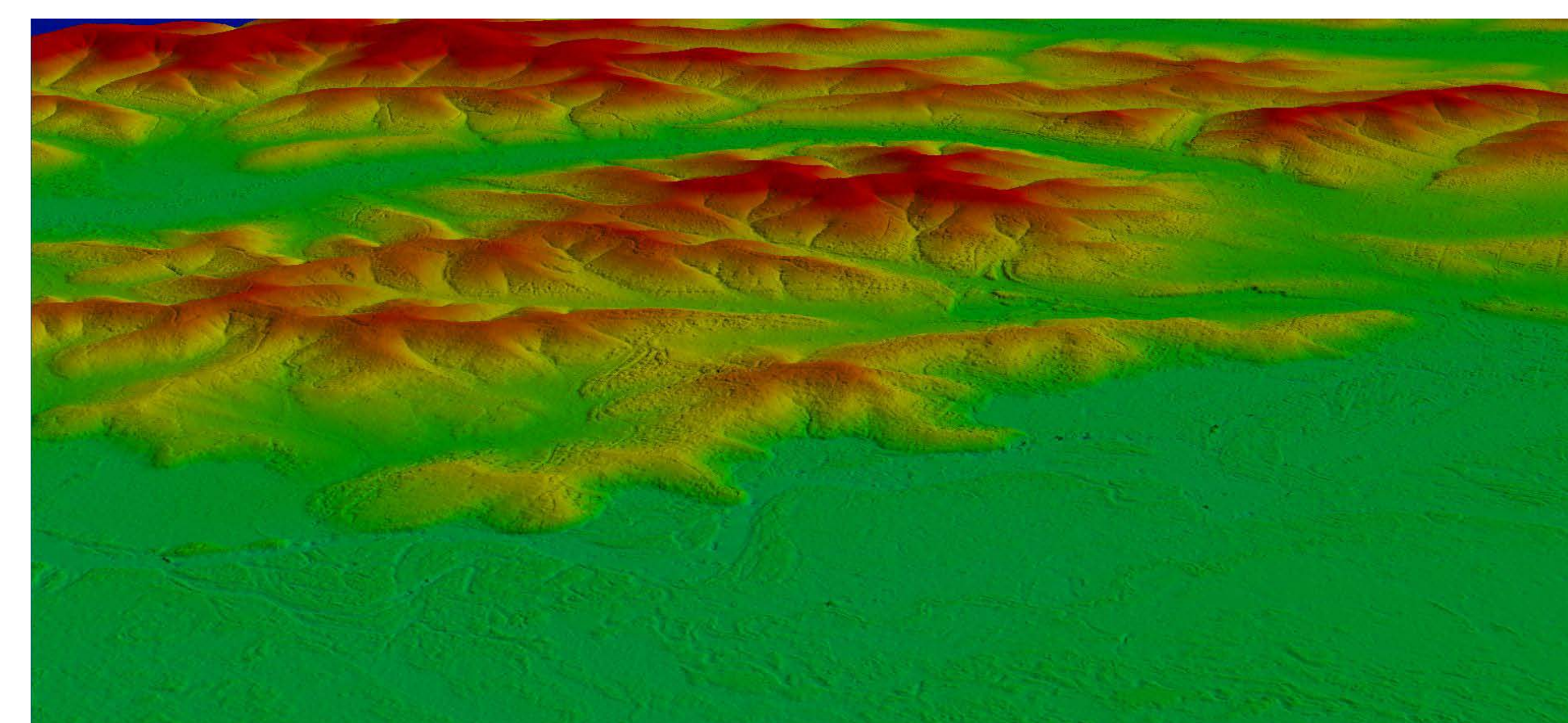


AHAP image of Bonanza Creek Experimental Forest

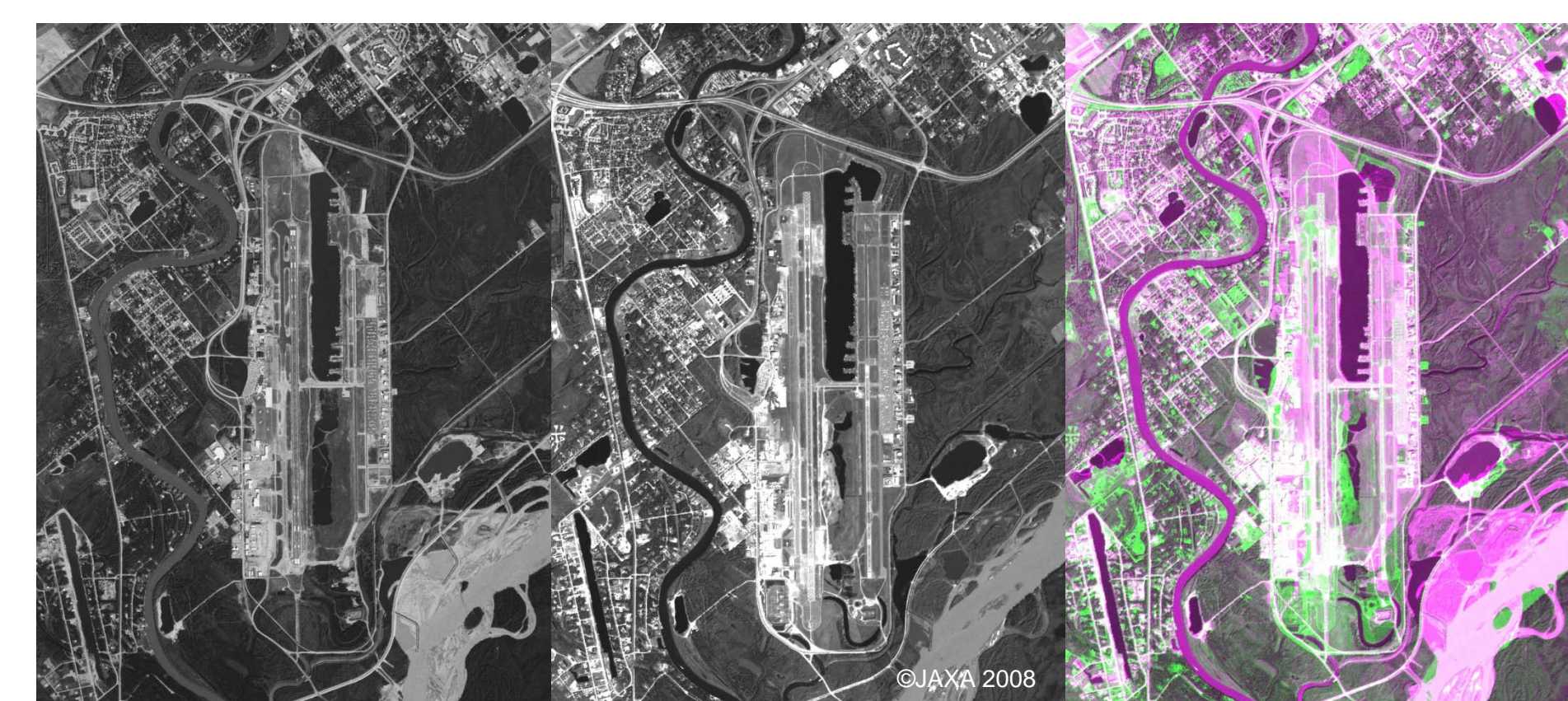
File size vs. Resolution

1800 Dots per inch (dpi) chosen as optimum resolution for the AHAP images. Results in reasonable file sizes and allows for 1.5m output orthoimagery

1.5 meter nominal resolution provides maximum sharpness and reduce the pixelation in the final product



ALOS PRISM DEM - 5m Resolution



AHAP ~ 1980

ALOS PRISM - 2008

Detected Change

Plans for the Future

Integrate field-collected GCPs into data set

-High-accuracy GCPs or orthoimagery required for proper orthorectification of AHAP

Orthorectify high-priority areas of Alaska

Transition to a more production-focused approach

The imagery may be used for a different of studies including :

-change detection in lakes, rivers, and glaciers, and monitor habitats of a variety of animals



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