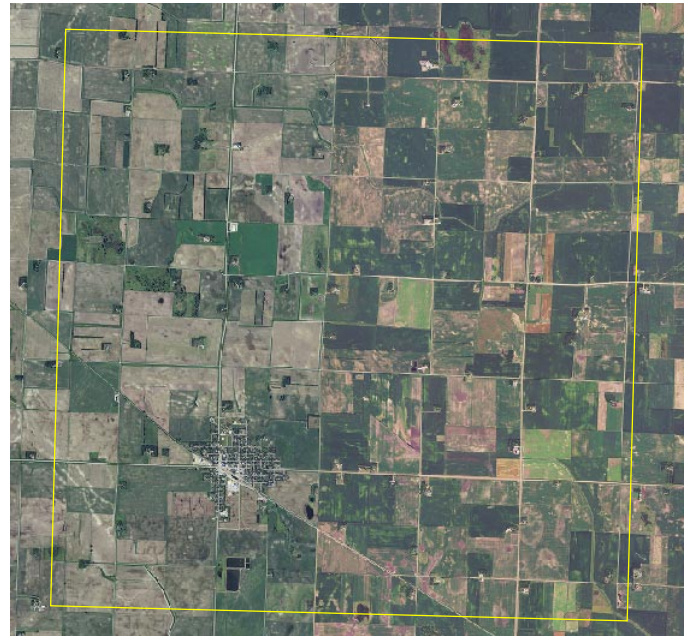
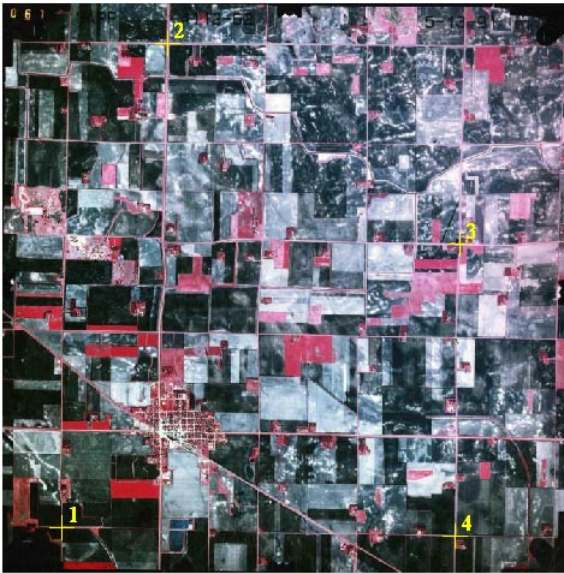


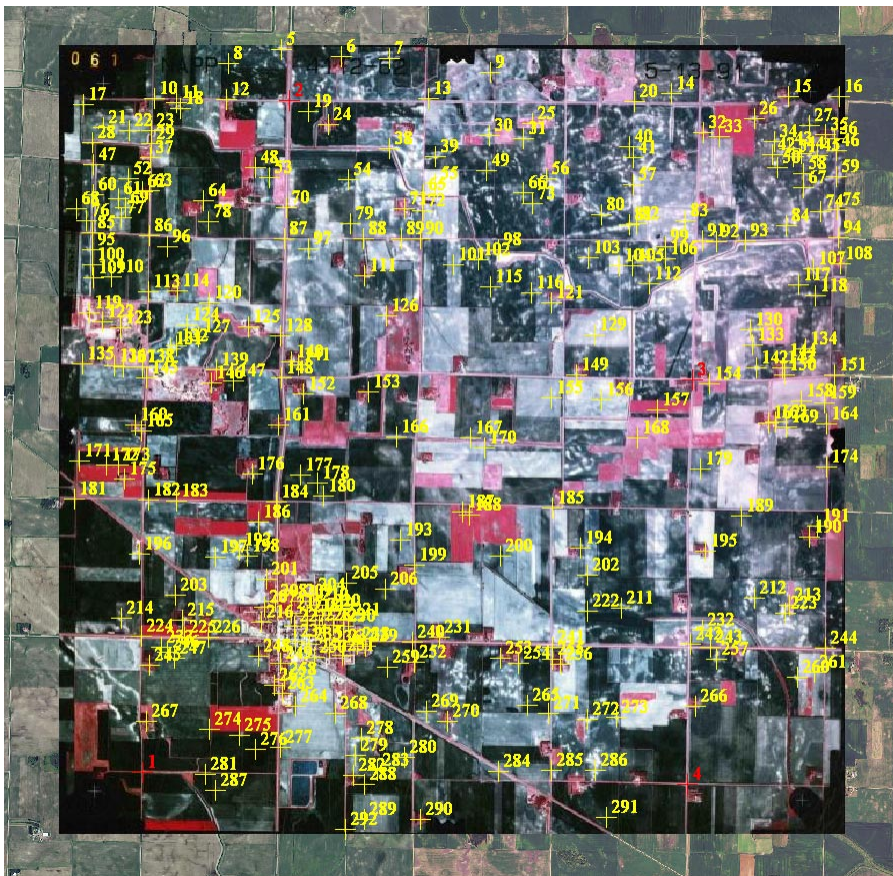
Auto-Register Scanned NAPP Aerial Photo



Input Image: Color-infrared aerial photo of Clarkfield, Minnesota and surroundings acquired 13 May 1991 by the National Aerial Photography Program (NAPP). Scan of photo (5418 columns by 5435 lines) has a cell size of 1.7 meters. Many agricultural fields are still bare in this early-season photo and show the gray-toned soils characteristic of southwest Minnesota. The four manually-placed control points (yellow) yield RMS residuals $X = 1.90$ cells, $Y = 3.10$ cells, $XY = 3.64$ cells using the Affine model.

Reference Image: Portion of USDA NAIP 2010 natural-color orthoimage mosaic of Yellowtail County, Minnesota (MrSID file) with cell size of 1 meter. The yellow box shows the approximate area covered by the aerial photo. The images in this orthoimage mosaic appear to have been acquired somewhat later in the growing season than the input photo. Many field boundaries are also different in the two images.

Auto-Register Result (overlaid on the NAIP reference image)



Auto-Register Settings:

Match red spectral component in each image:
 Input "Green" --> Reference "Red"
 Initial Accuracy Estimate: 5 cells
 Generated Point Spacing: 100 cells
 Maximum Point Residual: 4.0 cells
 Correlation Patch Size: 128
 Maximum Adaptive Model: Order 2 Polynomial

Auto-Register produced 288 control points

Using smaller Generated Point Spacing and/or larger Maximum Point Residual values may produce more control points.

Auto-register compared residuals using different models and found a significant improvement using the Order 2 Polynomial model, which was automatically set for the output points.

RMS Residuals:

$X = 1.25$ cells, $Y = 1.22$ cells, $XY = 1.75$ cells
 (Model = Order 2 Polynomial)

Mean Absolute Residuals:

$X = 1.05$ cells, $Y = 1.01$ cells