



Fort Hunter Liggett Historic Aerial Photo Ortho-rectification and Mosaic

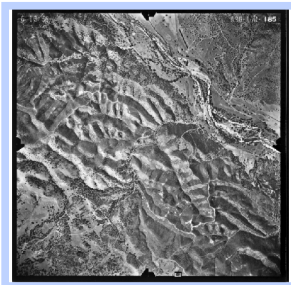
Background

Historic aerial photos can be valuable tools for identifying changes that have occurred in the state of natural resources due to past management decisions and thus provide clues about the future affects of current decisions and strategies. Historic hardcopy aerial photos can be converted to more useful digital formats through modern scanning hardware and software packages. In order to use these digital formats in a GIS package, however, they must be geographically referenced and terrain corrected.

MIRATEK Corporation & Pinnacle Mapping Technologies, Inc. (PMT) were contracted by Fort Hunter Liggett (FHL) in 2006 to orthorectify and mosaic 252 historic aerial photos acquired 24 August 1956.

Methods

The hardcopy photos were scanned by CEMML and given to PMT as grayscale .tif images. After converting from various .tif formats to one consistent format, the images were imported into Leica Photogrammetry Suite (LPS). In LPS, pyramid layers were built and photo fiducial marks were measured.

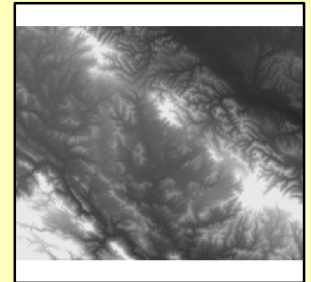


Raw tif Image

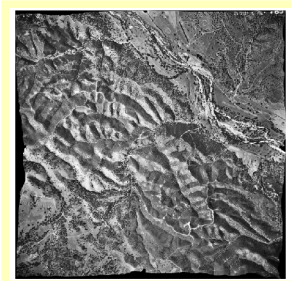
Using a 2002 Ikonos reference image, we manually selected and measured ground control points and added tie points. Using these control points and a 10m DEM we performed a self-calibrating bundle adjustment (to remove distortion due to camera lens, angle and terrain) and orthorectified the images.



2002 Ikonos Image



10-m DEM



Orthorectified Image
Total Root Mean Square
Error was 1.21 pixels or 0.61 m.

Each frame was assessed for quality control purposes and cutlines were generated between frames. Image dodging and color balancing techniques were used on all frames, and they were stitched together to produce the final mosaic.

In this project, we experienced some minor difficulties in totally eliminating seams in the mosaic due to a dramatic change in image tone on a frame by frame basis along flight lines. When zooming in on areas with minor seams, the difference in tone tends to be minimized and should not affect photo-interpretation.

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Special thanks to Art Hazebrook, ITAM coordinator FHL, for providing us with this opportunity.



Final Mosaic of All Frames Clipped to Fort Hunter Liggett Boundaries