

Due Date: 02/17/04

Name: _____

Lab #4: Photogrammetric Measurements

Objectives

- To review and understand how metric measurements can be made using aerial photos.

Ground resolution

The system resolution of a camera for aerial photography is conventionally specified as line-pairs per millimeter. It means how many pairs of black and white lines, when interleaved, can be identified within one millimeter. One line-pair provides the minimum ground separation for the adjacent features. Therefore, more line-pairs/mm indicates higher resolution, and vice versa. The resolution of a camera is used to determine whether a ground object of a specific size can be resolved on the photo and what is the appropriate flight height when a ground object of a particular size needs to be seen on the photo. (A brief discussion of how to acquire spatial resolution of aerial photography is provided on page 15 of your textbook.)

Photographs were acquired at a height (H) of 3040 m, with a camera of system resolution (R_s) of 40 line-pairs/mm, and lens focal length (f) of 152 mm. Use the following equation to calculate ground resolution (R_g) = _____ line-pairs/m. For these photographs, calculate minimum ground separation = _____ m. A traffic engineer will use these photos to count cars in parking lots where spaces between adjacent cars 0.6 m wide. Can the cars be counted (resolved) on these photographs? _____. Provide a short explanation for your answer.

$$R_g = \frac{f \times R_s}{H}$$

An agricultural agent plans to use the camera described above to photograph cornfields and count rows of corn. There is high contrast between rows of corn and intervening strips of bare soil. The cornrows and soil strips are both 0.75 m wide. What is maximum height (H) at which photographs can be acquired? _____ m. Hint: a row of corn and the adjacent strip of soil form a line-pair 1.5 m wide. Therefore the minimum required ground resolution (R_g) is 0.67 line-pairs/m. Use this value to calculate H from the above equation.

Photographic scale

A high-altitude reconnaissance aircraft acquires photographs from a height (H) of 18,000 m with a camera and lens with focal length (f) of 304 mm. Use Equation 6-2 in your textbook to calculate scale of the photographs 1: _____. A camera lens has a focal length of 200 mm. To acquire photographs with a scale of 1:50,000, the aircraft should fly at a height H = _____ m.

Relief Displacement

Use Equation 6-14 of your textbook to determine the height (h) of the building in upper right corner of Figure 6-10a in your textbook. You need to measure the displacement of the building top before using the equation. For this building, h = _____ m.