

ORDRE DES INGÉNIEURS DU QUÉBEC

MAY 2014 SESSION

Open-book examination
Calculators : only authorized models
Duration : 3 hours

14-GM-A4 PHOTOGRAMMETRY

QUESTION 1 (20 POINTS)

Considering the following data

- digital camera, image size : 20 010 pixels cross track, 13 080 pixels along track
- focal length : 210 mm
- pixel size (ground level, GSD) : 0,1 m
- physical pixel size : 5,2 μm
- panchromatic image (B&W) : 8 bits per pixel
- forward overlap : 70 %
- sidelap : 30 %
- mean ground height : 100 m

Calculate:

- a) image scale (4 points)
- b) flying height (4 points)
- c) image dimensions at the ground scale (4 points)
- d) distance between two exposure stations of a stereopair (air base) (2 points)
- e) spacing between adjacent flight strips (2 points)
- f) storage space per image (4 points)

QUESTION 2 (20 POINTS)

When developing a flight plan for a LiDAR project, the flight height must be determined in combination with four parameters in order to respect point spacing specifications. Give some information about these parameters.

QUESTION 3 (20 POINTS)

Collinearity equations are involved in many operations in photogrammetry. Describe two of them.

QUESTION 4 (20 POINTS)

Modern image acquisition systems are often used in combination with Global Navigation Satellite Systems (GNSS) and Inertial Measuring Unit (IMU). In the context of direct georeferencing, some quantities or parameters must be calibrated. What are they? Give some details about the calibration process.

QUESTION 5 (20 POINTS)

Two well known problems are encountered when using correlation algorithms, what are they and how they can be minimised?

Good luck!