EAS 426 / ENGR 301: Remote Sensing
Homework Set 2: Photogrammetry
Due March 4, 2022 BEFORE CLASS
Turn in to Blackboard

(1) The image formed by a digital camera on the detector array of photodiodes is 24 x 36 mm, and is equal to the size of the detector array. Assuming the individual photodiode detector elements have a size of 5 μm, how many pixels will the digital camera resolve? (Express your answer in megapixels.)

Note: The pixel size associated with each photodiode is square. The distance between photodetector elements is known as *pixel pitch* and is equivalent to the pixel spacing on the detector array.

(2) Consider a digital imaging sensor flown on an airplane. The optical system has a focal length of 7 cm. The imaging detector array is 15 cm x 15 cm.

(a) What altitude must the aircraft fly in order to image an area 10km x 10 km?

(b) If the pixel pitch for the sensor's detector array is 5 μm (as in problem 1), what is the resolution of the system assuming the aircraft flies at the altitude in (a)?

(c) If the system photographs a 25 meter tall tower, located 550 meters along-track from directly under the camera, what is the displacement of the top of the tower in the image plane (i.e. on the detector array) relative to the bottom of the building?

Hint: Consider relationship to *scale*

(d) Consider now that you wish to image a 15km x 15km area.

- Now what altitude must the aircraft fly?

- Now what is the spatial resolution of the system?