ANSWERS

Level 1: For the drone to be balanced, the moment equation on either side of the lift point must be equal.

$$force_{left} * distance_{left} = force_{right} * distance_{right}$$

For our problem, "left" and "right" refer to "thermal camera" and "regular camera" respectively.

$$force_{thermal\ camera} * distance_{thermal\ camera} = force_{regular\ camera} * distance_{regular\ camera}$$

$$6N * 2cm = 10N * distance_{regular\ camera}$$

$$12 = distance_{regular\ camera} * 10$$

$$distance_{regular\ camera} = \frac{12}{10}$$

$$distance_{regular\ camera} = 1.2cm$$

The regular camera should be 1.2 cm from the centerline on the drone.

This drone, flown by FAA-certified drone pilots, is used to capture images of our turbines. These drones are engineered to remain balanced throughout their flight.

Level 2: Because we do not know the drone lift point, we must refer to the distances in our moment equation in terms of variables.

$$force_{left\ side} * distance_{left\ side} = force_{right\ side} * distance_{right\ side}$$

$$6N * distance_{left\ side} = 10N * (5cm - x)$$

$$6 * distance_{left\ side} = 50 - 10x$$

$$16 * distance_{left\ side} = 50$$

$$distance_{left\ side} = \frac{50}{16} cm$$

$$distance_{left\ side} = 3.125\ cm$$

The drone lift point should be 3.125 cm from the left end of the board or 1.875 cm from the right end of the board. We can check our understanding by noting that the pivot point is closer to the bigger force! It's just like balancing a pair of scissors on your fingers. The handle is much closer to your fingers as its usually heavier than the blades.