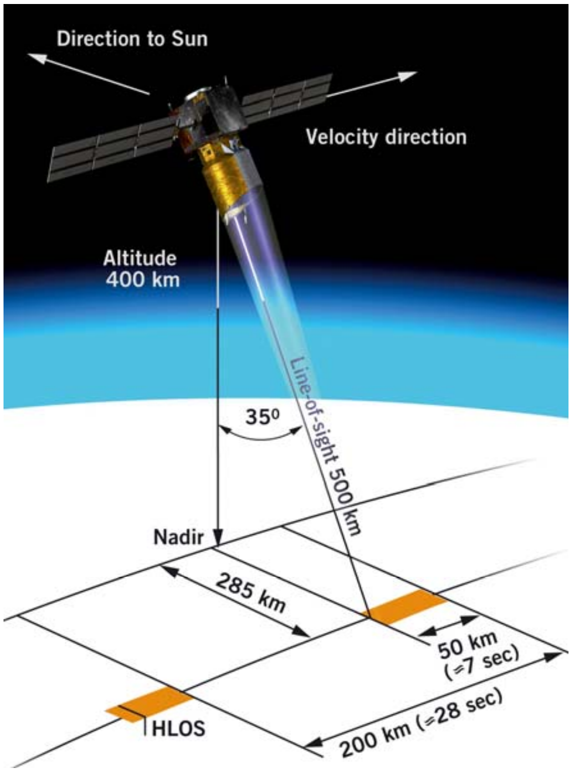

Credits: ESA - AOES Medialab

Most satellite imaging systems do not remain fixed over a target because they are in orbit around Earth or the Moon. For ordinary digital photos we do not want our Subject to move and cause blurring of the image. For satellite photography, it is unavoidable that the satellite in its orbit, or the Target are in motion.

Once we have determined the resolution that our satellite camera needs to study a Target, we also have to keep track of image and Target motion which can also blur the image.

To avoid blurring, we do not want the scene being photographed to move by more than one pixel during the exposure time.

Problem 1 – The satellite travels at a ground speed of 10 kilometers/sec. The CCD camera will not be designed to mechanically track the Target as it passes-by. What will be the angular speed, W, in pixels/sec, of the ground Target traveling across the CCD image if the satellite is in an orbit 350 km above the ground and has a resolution of 6 arcseconds/pixel?

Problem 2 – What must be the maximum exposure time of the CCD image in order to avoid image blurring?

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Answer: Since θ = 206265 L/d, and L = 10km, d = 350 km, the angular speed W = 206265 x (10/350) = 5893 arcseconds/sec. The resolution is 6 arcseconds/pixel, so the speed is
w = 5893/6
= **982 pixels/sec**.

Problem 2 – What must be the maximum exposure time of the CCD image in order to avoid image blurring?

Answer: T = 1 Frame x 1 second /982 Frames
so **T = 0.001 seconds**