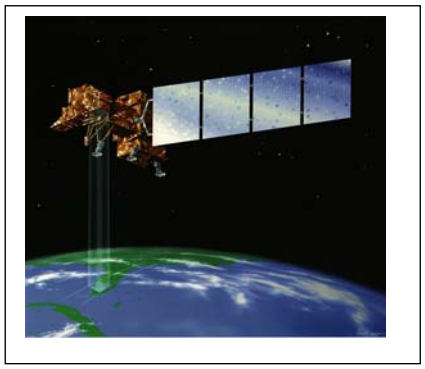
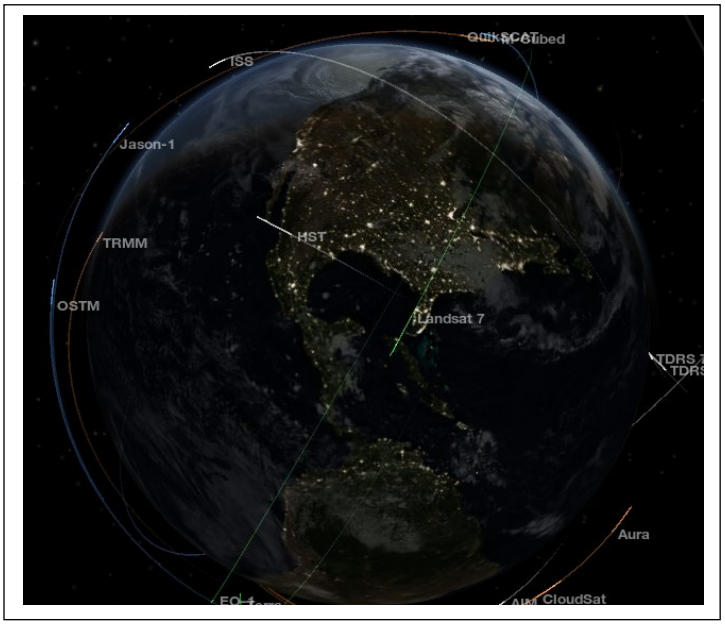
Eye Spy – Exploring the LANDSAT-7 Orbit Around Earth





Get the Data

Visit EOSS **http://1.usa.gov/ODMSKc** to recreate the scene shown above. Recommended operating system: MS Vista or later; Browser: MS Internet Explorer 8 or later.

Step 1 – Click on the 'Visual Controls' tab and make sure that the following items are selected with a 'white spot': spacecraft, planets, labels, orbit lines, trails and metric.

Answering Questions

The image above from *Eyes on the Solar System* shows a portion of the orbit of Landsat-7 on June 14, 2012 at 11:24 PM as it passes along the coast of Florida.

Problem 1 – The Landsat-7 satellite consumes 1,552 watts of electricity. If each of the four solar panels produces ¼ of this power, how much power does each solar panel generate?

Problem 2 – During 8/13 of a single orbit, which lasts 104 minutes, Landsat-7 passes over land areas classified as forested, urban and agricultural. If the forested land is 1/3 of the total land area, how many minutes is Landsat-7 observing forested land in this orbit?

Math Challenge

Suppose that during two orbits Landsat-7 images the following types of surfaces:

Orbit 1) 3/5 water 1/6 forest 7/30 developed

Orbit 2) 3/4 water 1/8 forest 1/8 developed

What is the average amount of surface area that is covered by water?

Answer Key

Problem 1 – The Landsat-7 satellite consumes 1,552 watts of electricity. If each of the four solar panels produces ¼ of this power, how much power does each solar panel generate?

Answer: ¼ x 1552 = **388 watts.**

Problem 2 – During 8/13 of a single orbit, which lasts 104 minutes, Landsat-7 passes over land areas classified as forested, urban and agricultural. If the forested land is 3/8 of the total land area, how many minutes is Landsat-7 observing forested land in this orbit.

Answer: 104 minutes x 8/13 = 64 minutes. Then 64 minutes x 3/8 = **24 minutes.**

Math Challenge: Suppose that during two orbits Landsat-7 images the following types of surfaces:

Orbit 1) 3/5 water 1/6 forest 7/30 developed

Orbit 2) 3/4 water 1/8 forest 1/8 developed

What is the average amount of surface area that is covered by water?

Answer: Average = 1/2 x (3/5 + 3/4) The Common Denominator is 5x4 = 20 so

Average = 1/2 x (3(4)/20 + 3(5)/20)

Average = 1/2 (27/20)

Average = 27/40