The Remote Sensing Process

1. Energy Source
2. Atmospheric Interference
3. Surface Interactions
4. Atmospheric Interference (path radiance)
5. Sensor
6. Analysis

Satellite sensors “see” reflected and emitted radiation
Data is saved as bits (0’s and 1’s)

8 bit data = 256 values
has a range 0 to 255

\[ 2^n \cdot 2^8 = 256 \]
## Digital Imagery

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Remote sensing images use the electromagnetic spectrum.
Spectral Reflectance Curves

Spectral Reflectance

High

Low

Spectral Reflectance

Spectral Region

Blue    Green     Red            Near IR                  Mid IR

Water

Vegetation

Soil

Water
Platforms Used to Acquire Remote Sensing Data

• **Aircraft**
  - Low, medium & high altitude
  - Higher level of spatial detail

• **Satellite**
  Polar-orbiting, sun-synchronous
  800-900 km altitude

  Geo-synchronous
  35,900 km altitude, 24 hrs/orbit
  stationary relative to Earth
Spectral Bands of Landsat 7

Spectral Reflectance

High

Low

Spectral Region

Blue    Green     Red            Near IR                  Mid IR

Water

Vegetation

Soil

Water
True Color Image

Band 1 = Blue, Band 2 = Green, Band 3 = Red

Colors are the same as our eyes see
Spectral Bands of Landsat 7

Spectral Reflectance

High

C 2 3 4

Spectral Region

Blue    Green    Red          Near IR            Mid IR

Water

Vegetation

Soil

Low

Spectral Reflectance

Blue    Green    Red    Near IR    Mid IR

Water

Vegetation

Soil
False Color Infrared Image

Band 2 = Blue, Band 3 = Green, Band 4 = Red

Sediment is bright

Clear water is dark

Vegetation is red
Spectral Reflectance

High

Low

Spectral Bands of AVHRR

Spectral Region

Blue    Green     Red            Near IR                  Mid IR

Water

Vegetation

Soil

Water
Changes solar radiation incident on the earth

Clouds
Water vapor
Gases – CO2, O3,
Pollution – smog, smoke
Aerosols – volcanic, sea salt
Temperature
Location – latitude
Topography – slope of the earth
Altitude
Time of day
Day of year
Landsat 7 Path 20 Row 31 7/7/2002
Landsat 7 Path 20 Row 31 9/9/2002