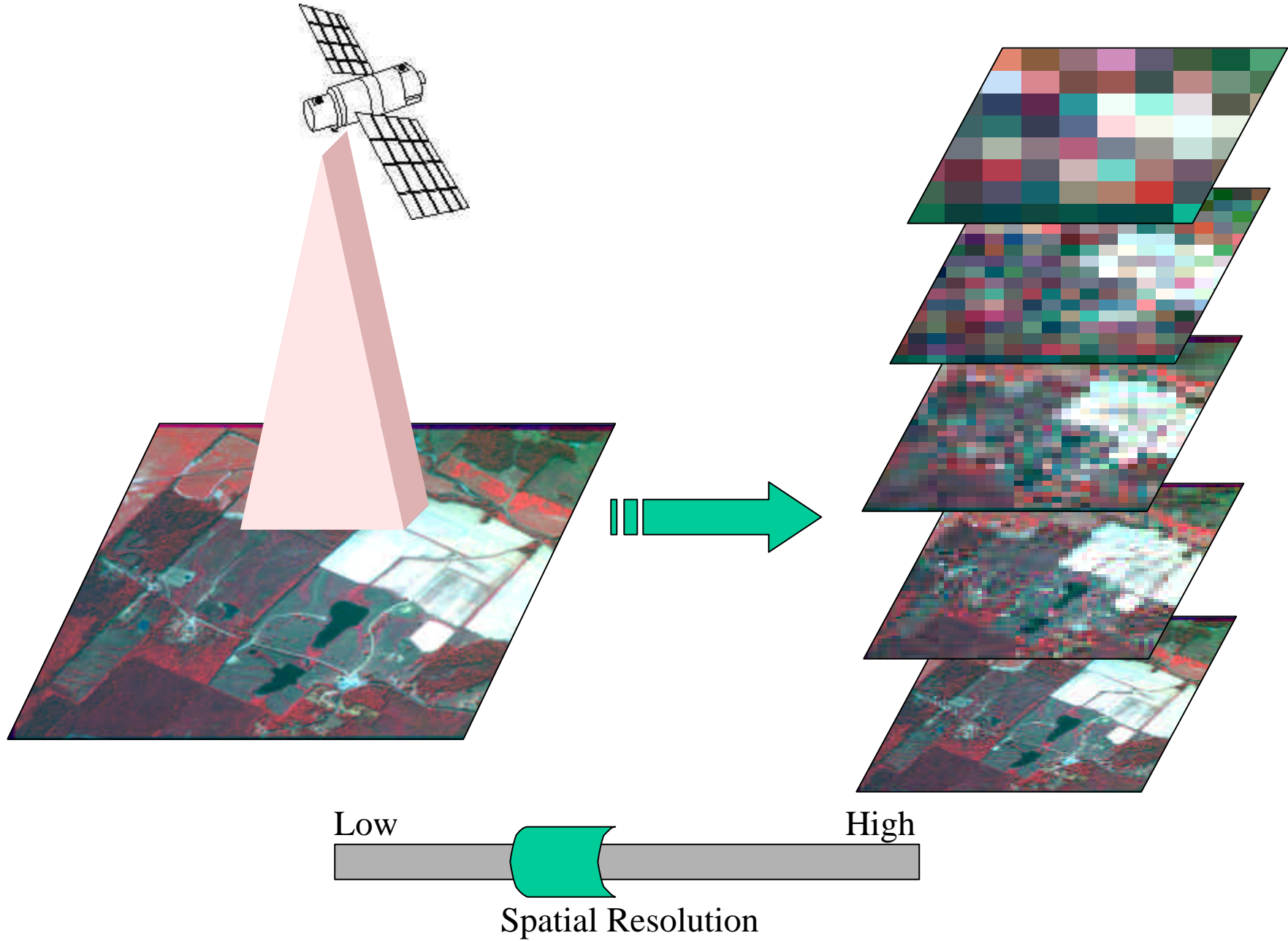
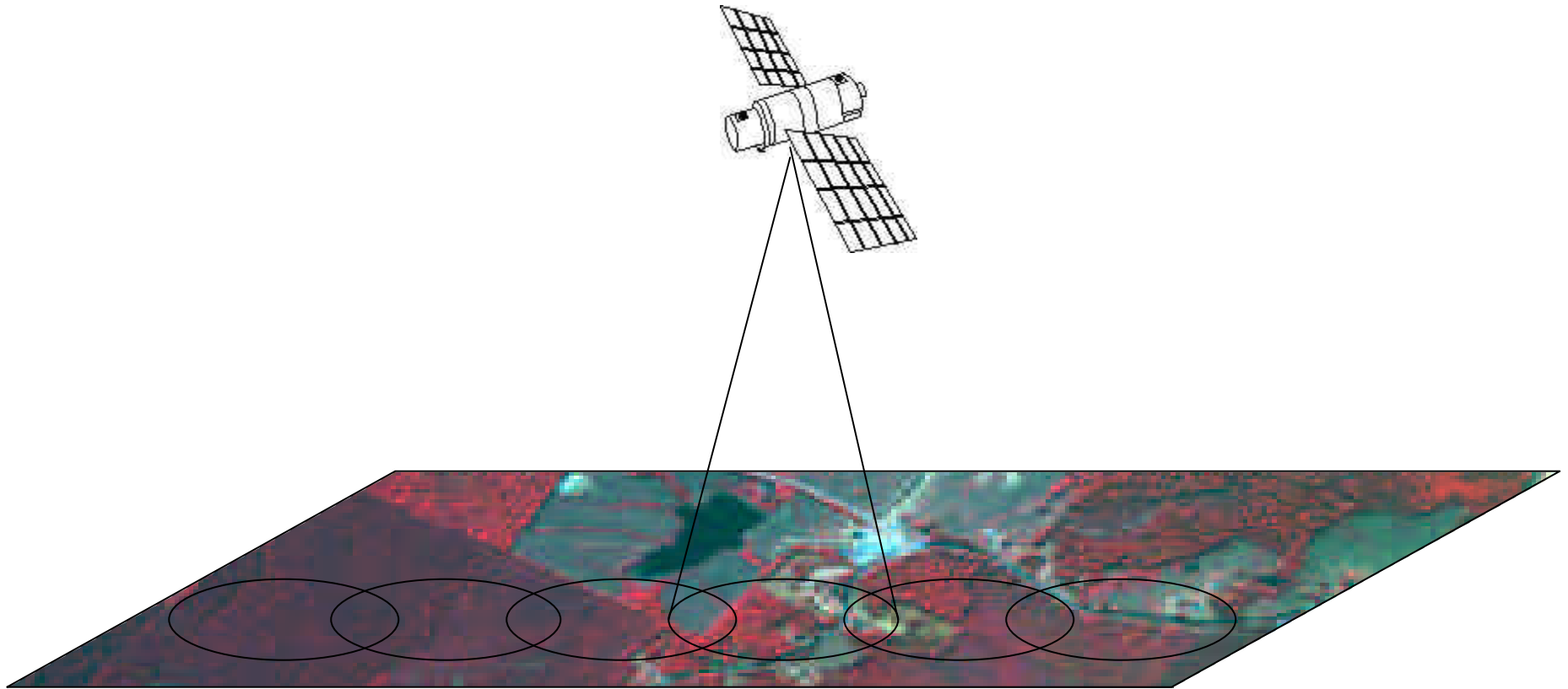


# Spatial Resolution



# Image Acquisition via Space-based Sensor



Row of Pixels

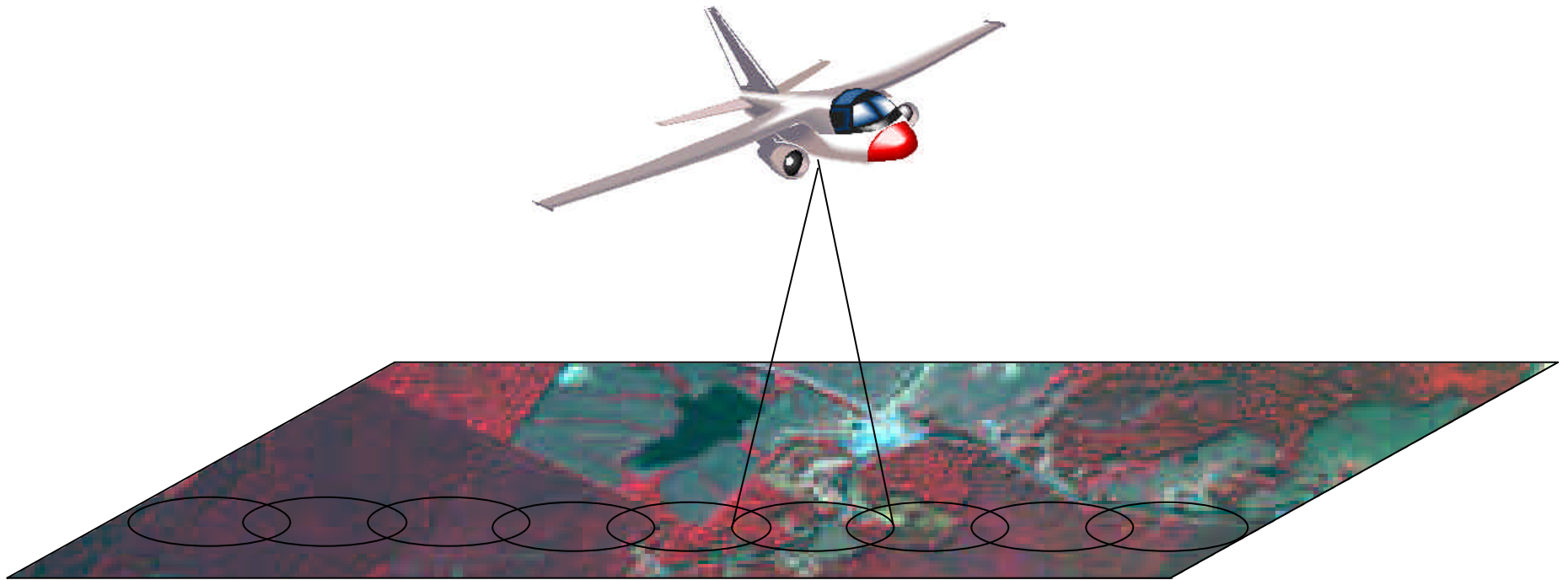
Space-based

Airborne



Pixel's displayed gray-level associated with the sensitivity of the corresponding field-of-view

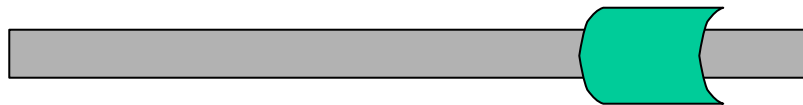
# Image Acquisition via Airborne Sensor



Row of Pixels

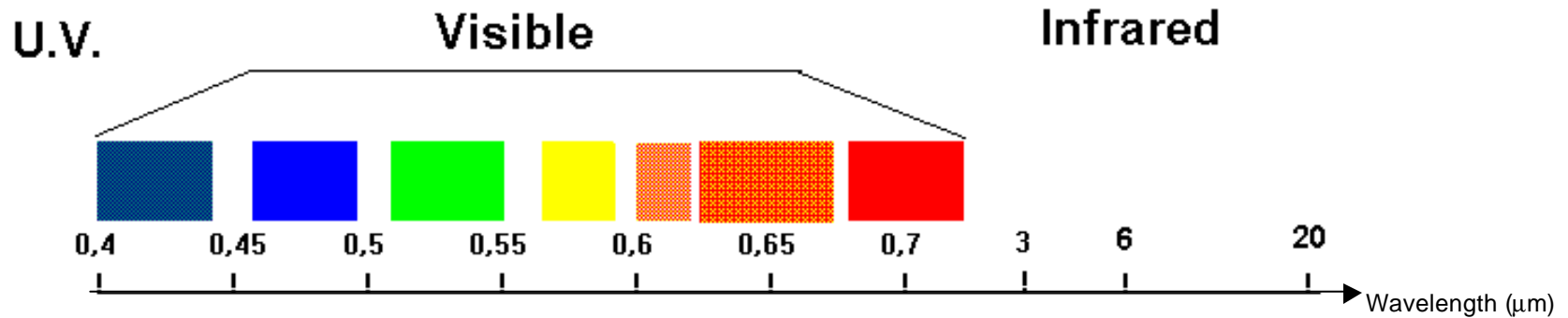
Space-based

Airborne

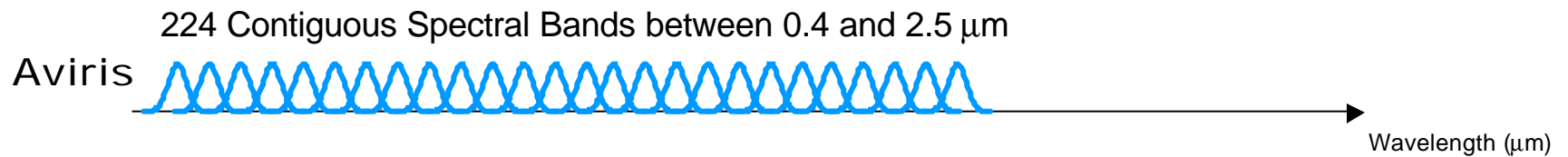
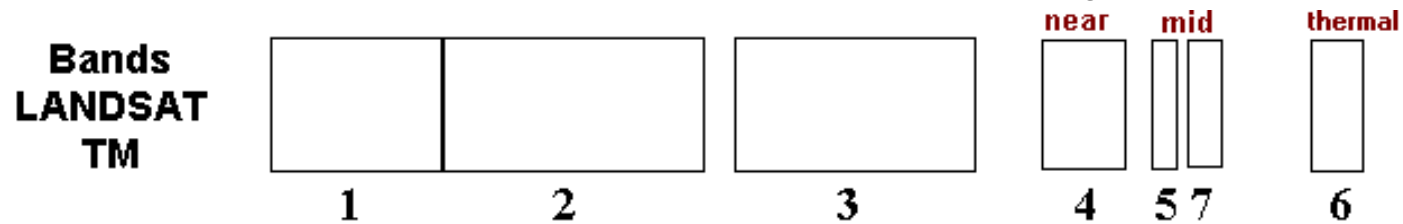


Pixel's displayed gray-level associated with the sensitivity of the corresponding field-of-view

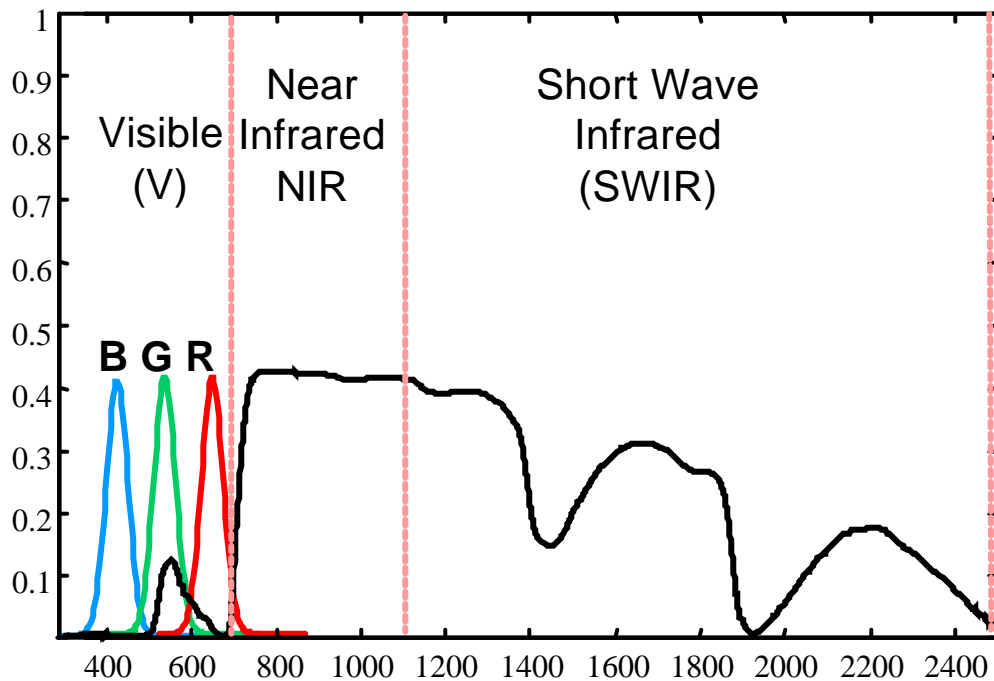
# Multispectral Vs. Hyperspectral Sensors



7 Bands in the visible and infrared portions of the electromagnetic spectrum



# Visualization of Multispectral/Hyperspectral Imagery

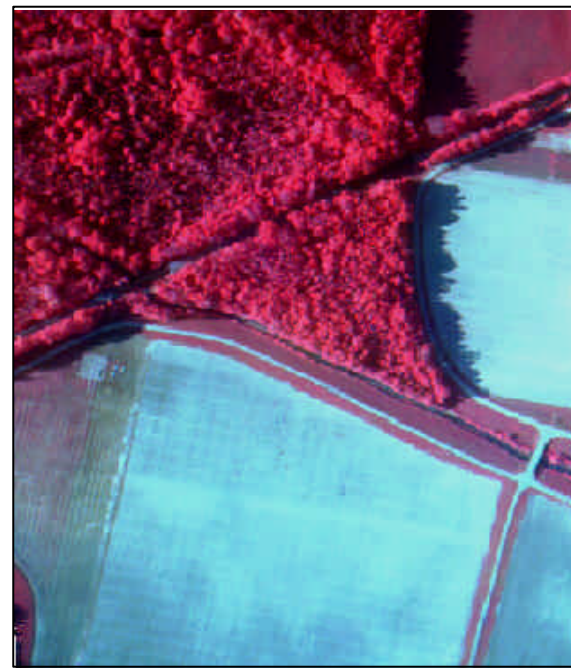
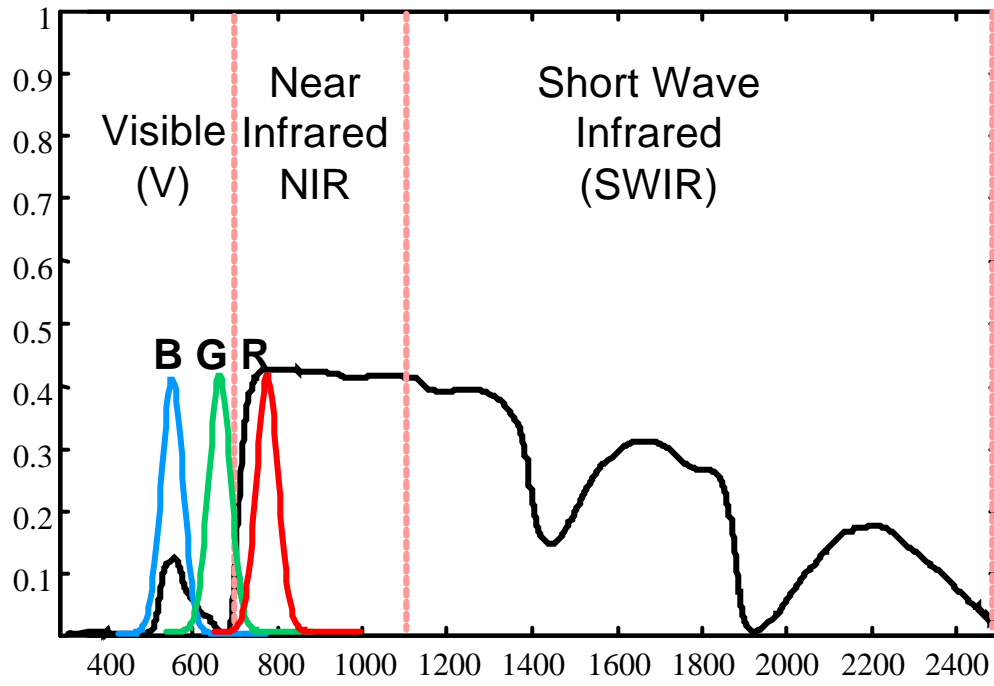


Natural-colored Image

False-colored Image



# Visualization of Multispectral/Hyperspectral Imagery



Natural-colored Image

False-colored Image



# Temporal Resolution

Vigorous  
Vegetation

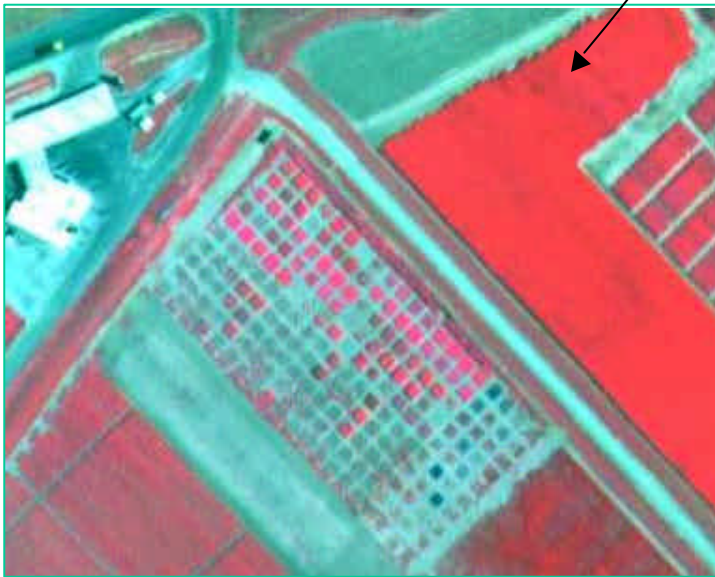


Image Collected  
August 9, 2000

No Longer  
Vigorous  
Vegetation

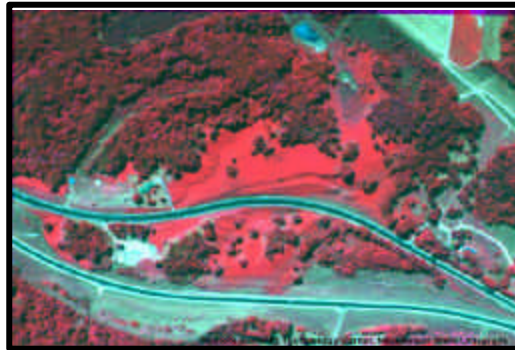


Image Collected  
September 26, 2000

$$\text{Res}_{\text{temp}} = \frac{1 \text{ image}}{48 \text{ days}} = 0.02 \frac{\text{image}}{\text{day}}$$



Kudzu (*Pueraria montana*) is a deciduous, perennial, climbing vine. It is native to Japan and China and was introduced to the United States in 1876. It is common to the southeastern US and can be quite destructive, destroying neighboring plants.

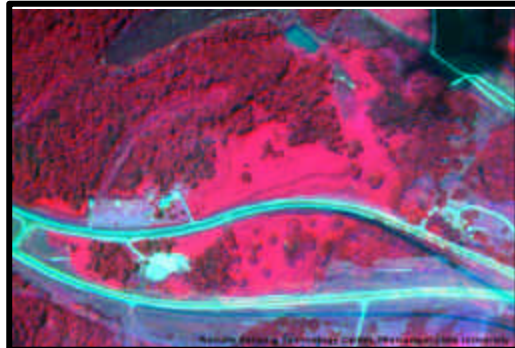


This is a remotely sensed, multispectral image taken in north Mississippi. We can easily detect the large expanse of kudzu in this scene.

Collection Date: August 30, 2000

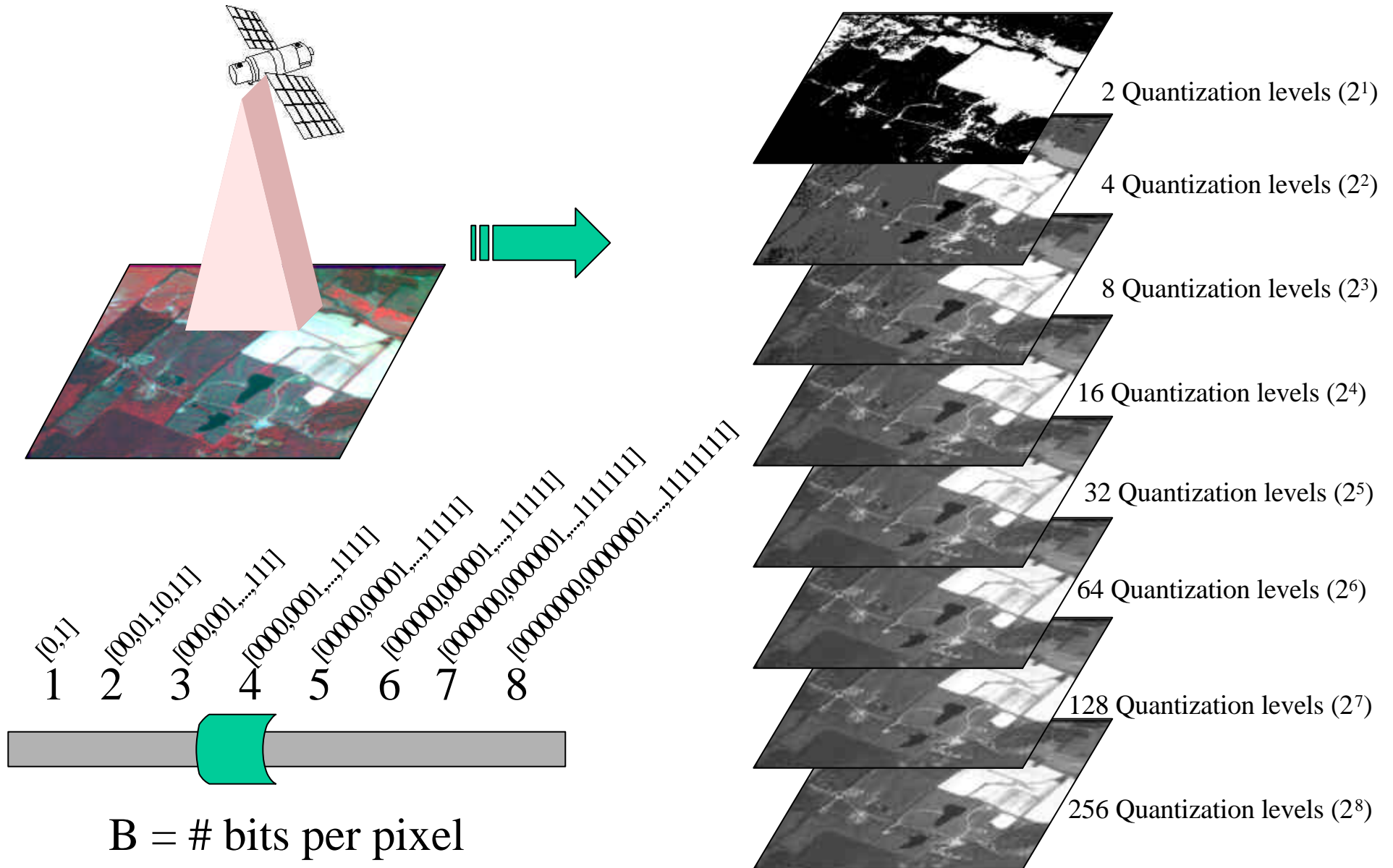


Collection Date: February 1, 2001



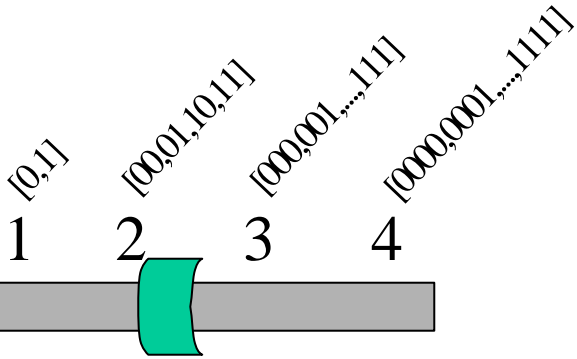
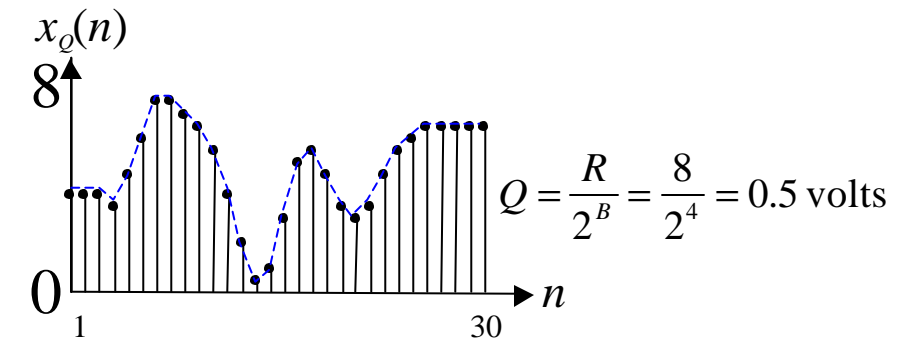
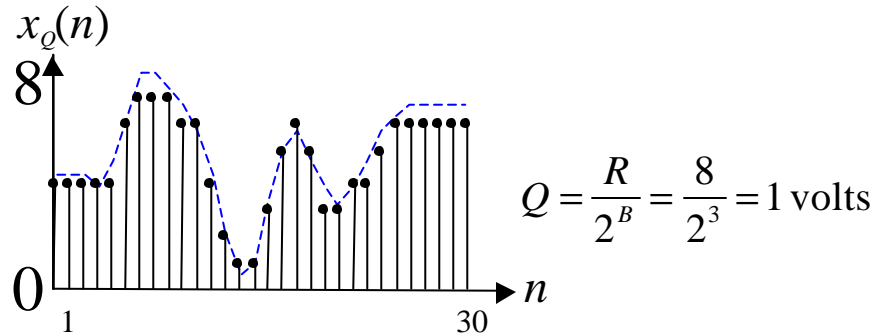
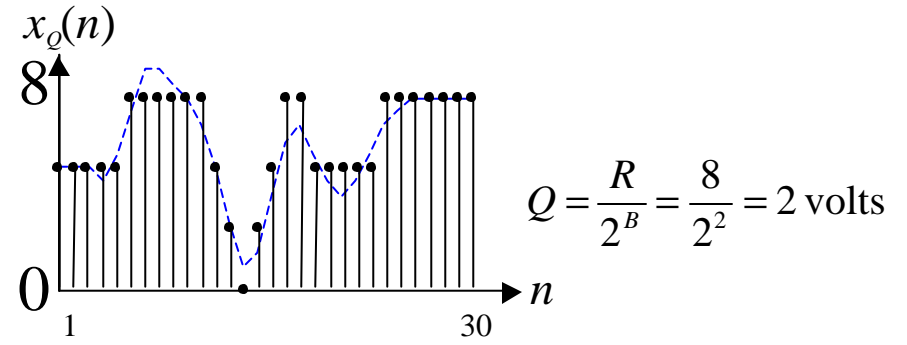
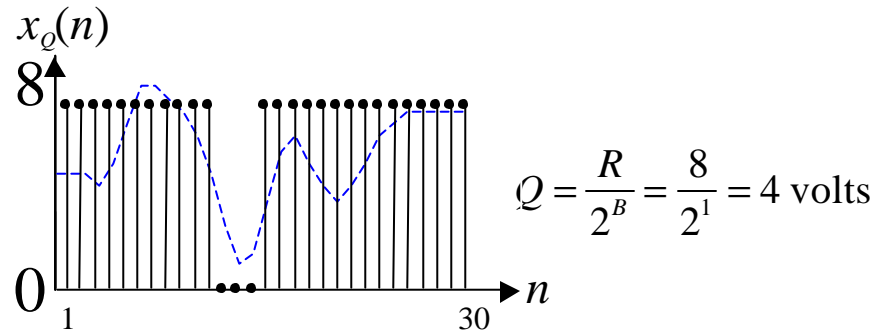
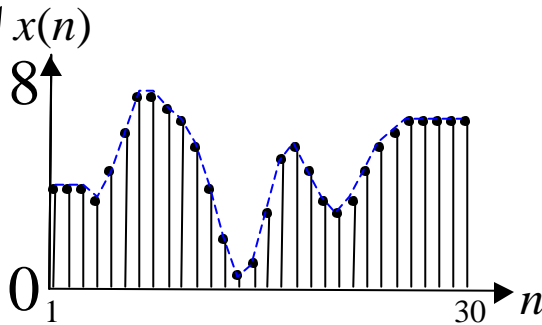
Collection Date: July 16, 2001

# Radiometric Resolution



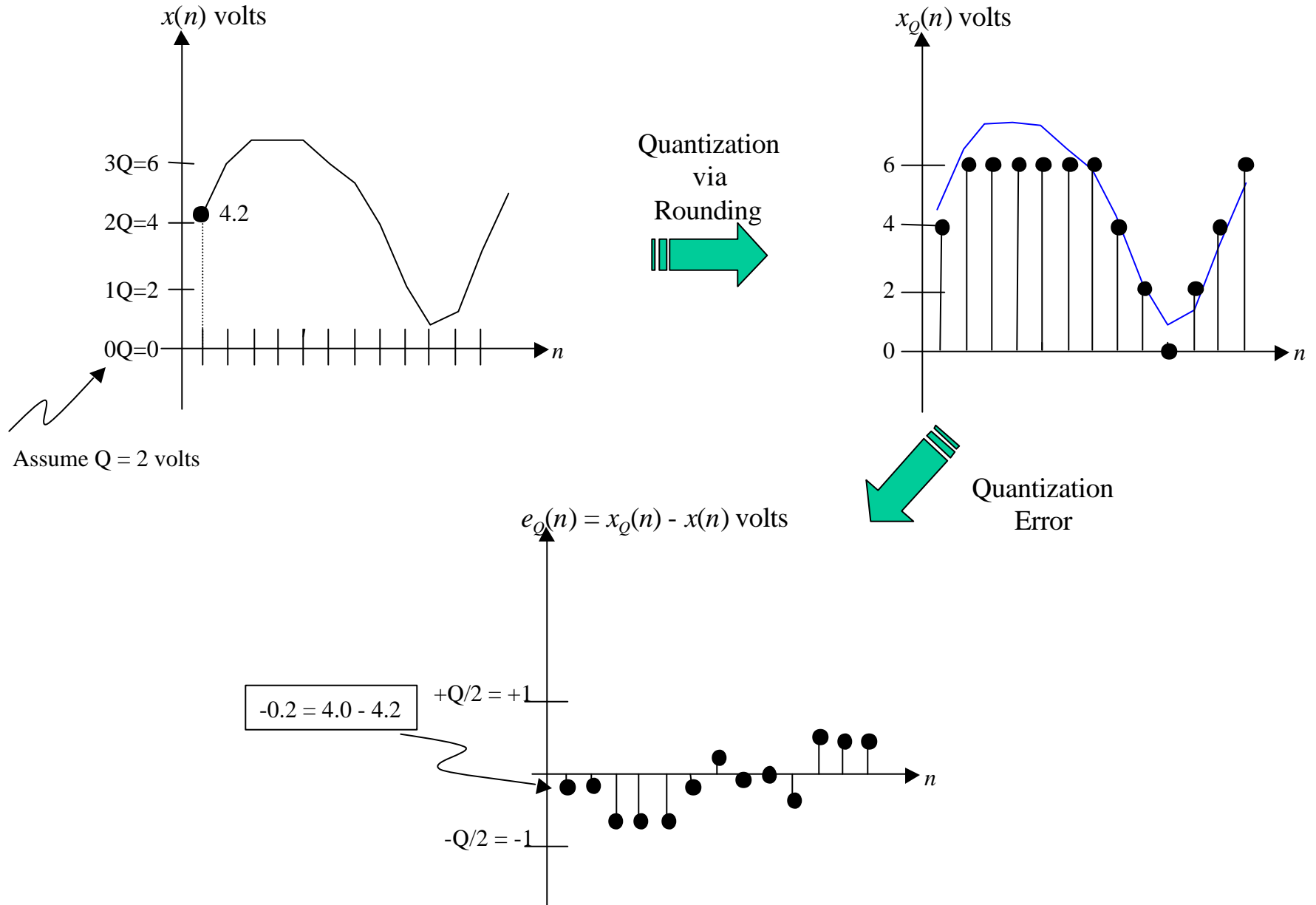
# Quantization (Varying the Radiometric Resolution)

R=8volts

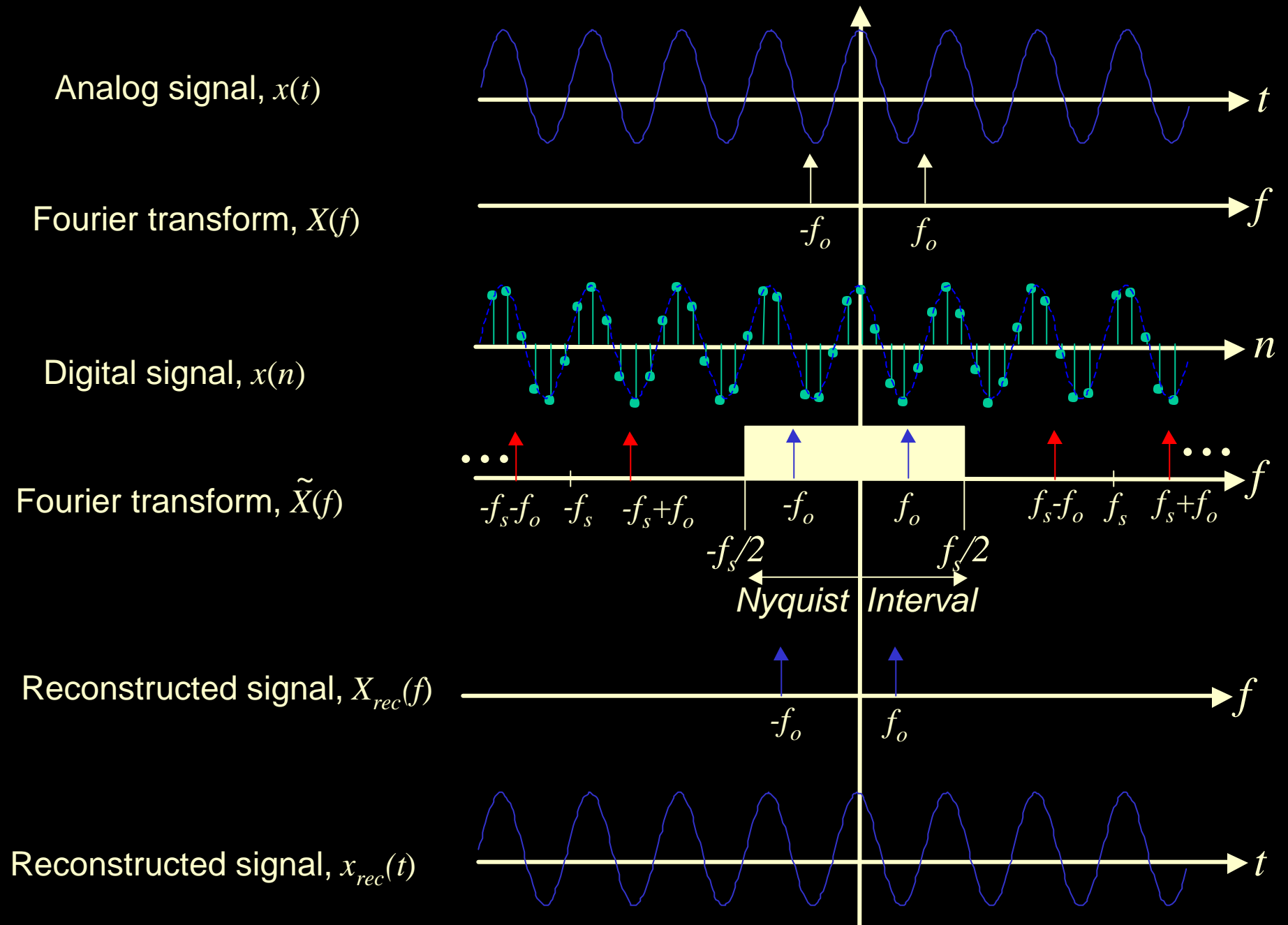


B = # bits per pixel

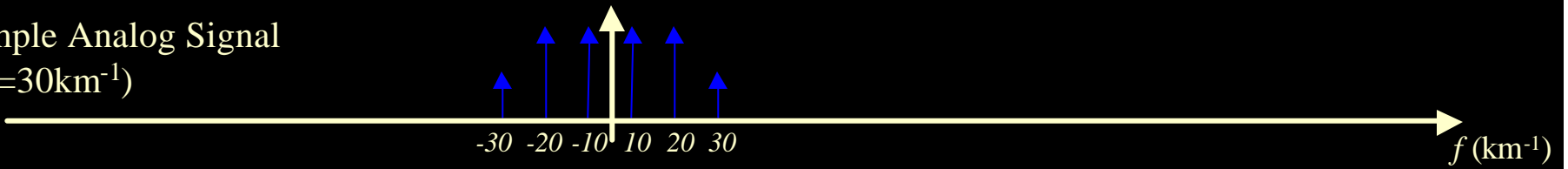
# Quantization Error Due to Rounding



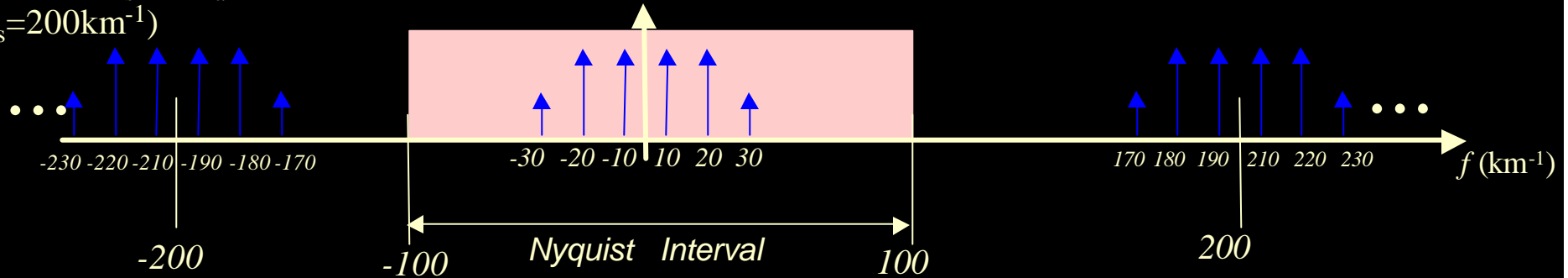
# Spectral Replication due to Sampling and Ideal Reconstruction



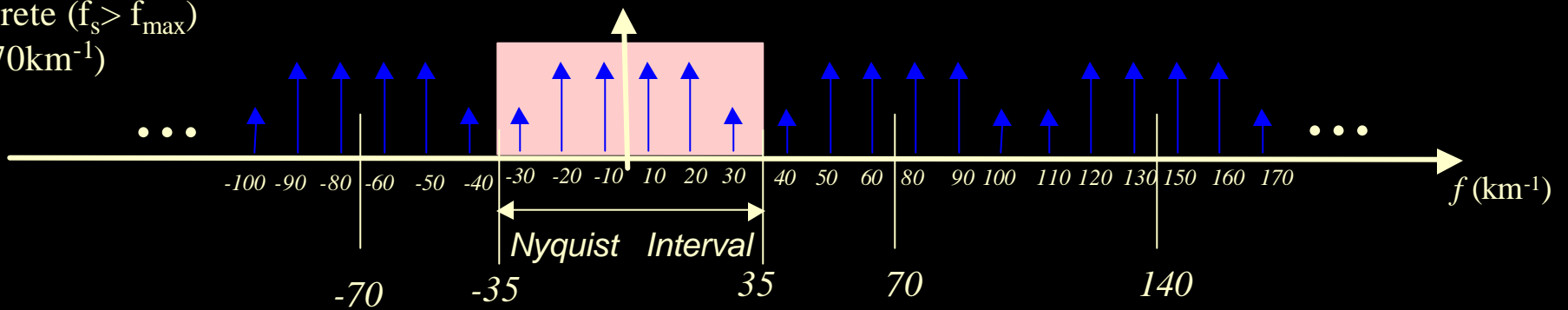
Example Analog Signal  
( $f_{\max}=30\text{km}^{-1}$ )



Discrete ( $f_s \gg f_{\max}$ )  
( $f_s=200\text{km}^{-1}$ )



Discrete ( $f_s > f_{\max}$ )  
( $f_s=70\text{km}^{-1}$ )



Discrete ( $f_s < f_{\max}$ )  
( $f_s=45\text{km}^{-1}$ )

