

Spectral Response for DigitalGlobe Earth Imaging Instruments

QuickBird

The QuickBird satellite carries a high resolution panchromatic band covering most of the silicon response and four lower resolution spectral bands. The four multi-spectral bands are roughly based on four bands used on the Landsat satellite series, including blue, green, red and near-infrared. The spectral responses of the bands are shown in Figure 1, individually normalized to the maximum value. Table 1 gives the 5% response upper and lower edges and center wavelengths for each.

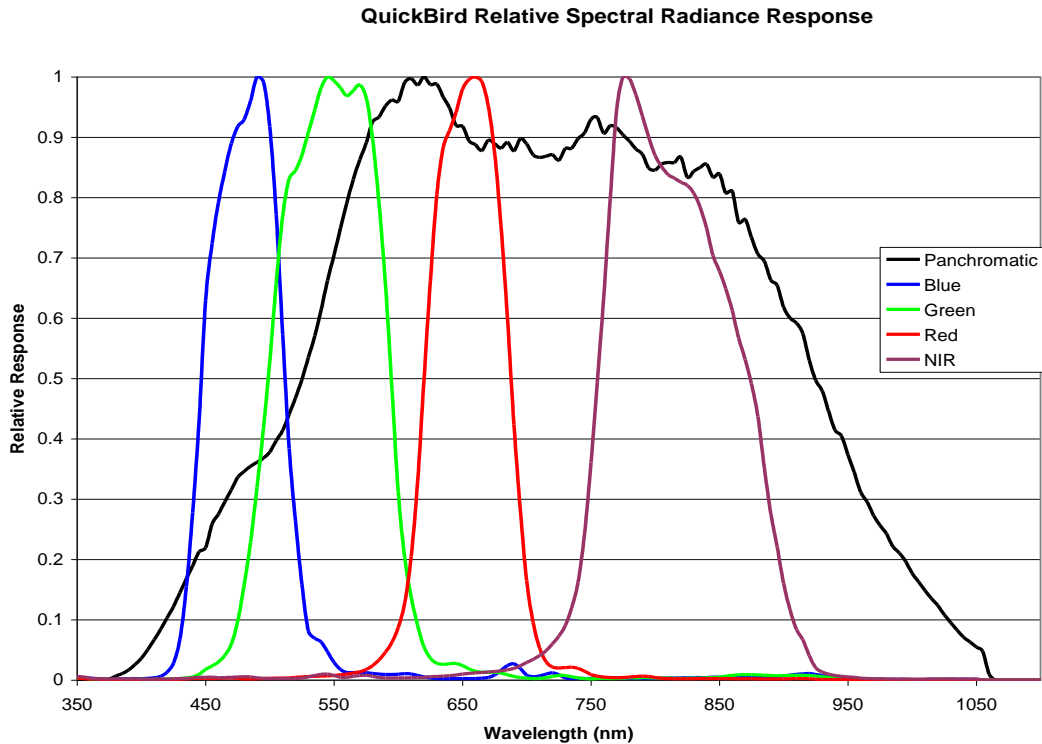


Figure 1. Spectral Response of the QuickBird panchromatic and multispectral imager.

Table 1. QuickBird Spectral Band Edges and Center Wavelengths

Band Name	Center Wavelength (nm)	Minimum Lower Band Edge (nm)	Maximum Upper Band Edge (nm)
Panchromatic	729	405	1053
Blue	488	430	545
Green	543	466	620
Red	650	590	710
NIR	817	715	918

WorldView 1

The WorldView 1 satellite carries a panchromatic only instrument to produce basic black and white imagery for government and commercial customers who do not require color information. The spectral response band includes both visible and near infrared light for maximum sensitivity. The estimated spectral radiance response, expressed as output counts per unit radiance as a function of wavelength, normalized to unity at the peak response wavelength is shown in figure 2.

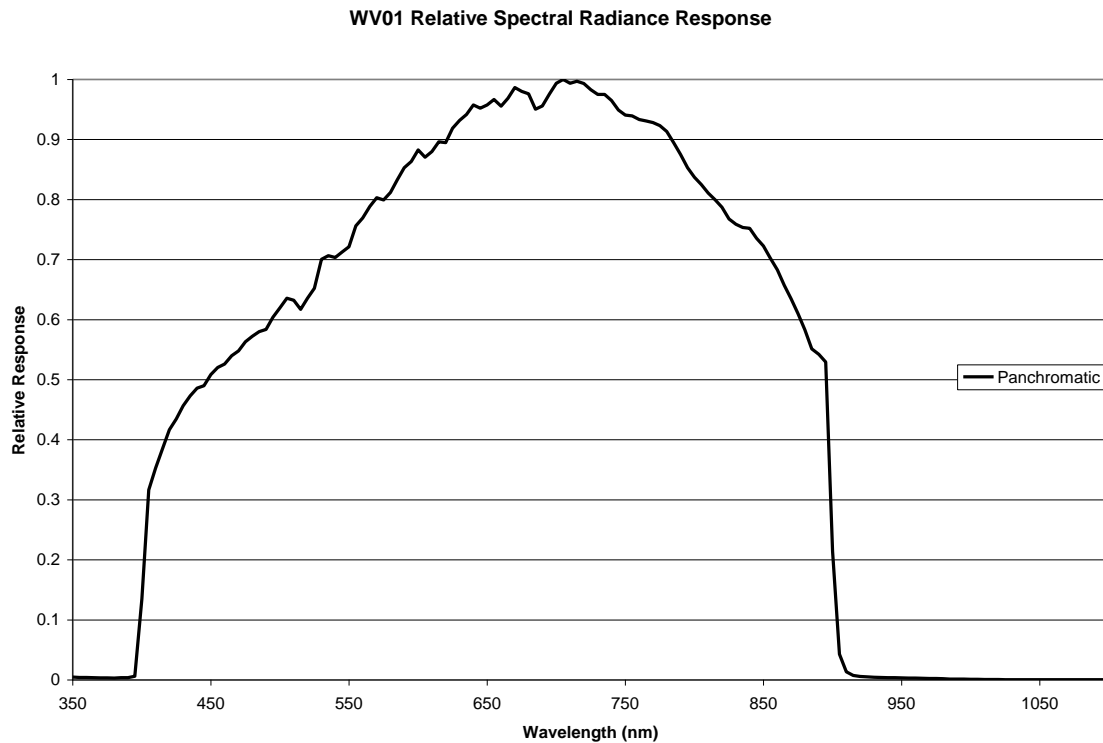


Figure 2. Spectral Response of the WorldView 1 panchromatic imager.

WorldView 2

The WorldView 2 satellite carries an imaging instrument containing a high-resolution panchromatic band with a reduced infrared and blue response and eight lower spatial resolution spectral bands. The multi-spectral bands are capable of providing excellent color accuracy and bands for a number of unique applications. The four primary multi-spectral bands include traditional blue, green, red and near-infrared bands, similar but not identical to the QuickBird satellite. Four additional bands include a shorter wavelength blue band, centered at approximately 427 nm, called the coastal band for its applications in water color studies; a yellow band centered at approximately 608 nm; a red edge band centered strategically at approximately 724 nm at the onset of the high reflectivity portion of vegetation response; and an additional, longer wavelength near infrared band, centered at approximately 949 nm, which is sensitive to atmospheric water vapor. The spectral responses of the bands are shown in Figure 3, individually normalized as in Figure 1.

Table 2 gives the 5% response upper and lower edges and center wavelengths for each band for both WorldView 1 and WorldView 2.

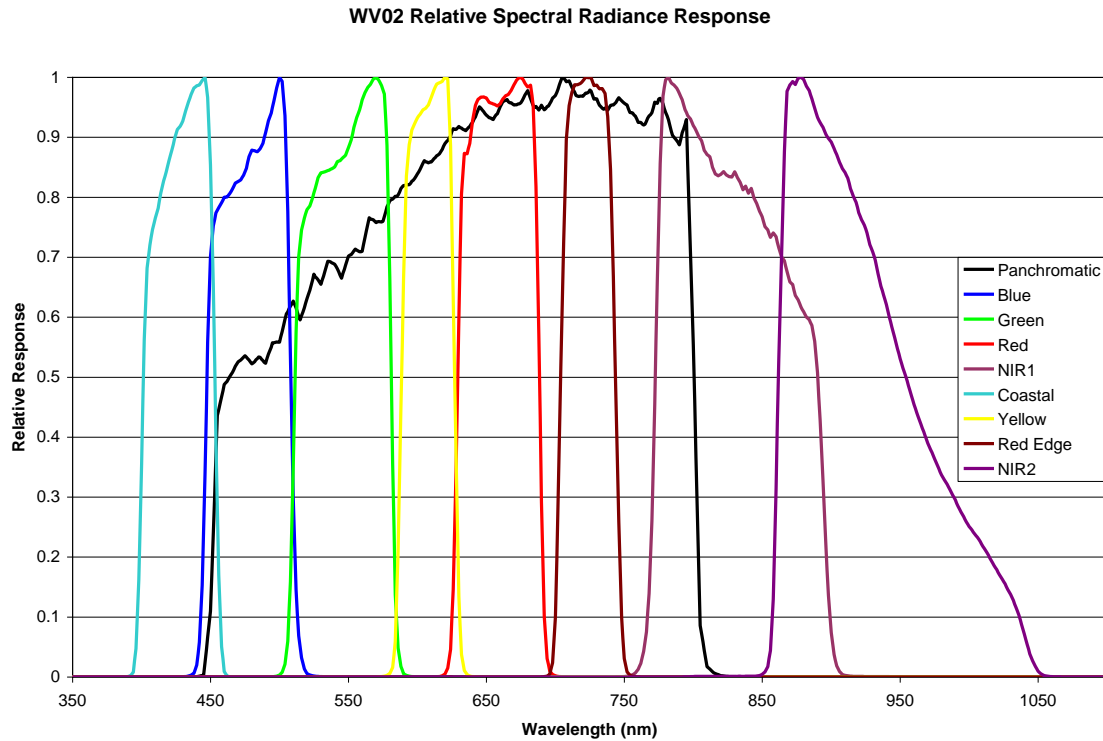


Figure 3. Spectral Response of the WorldView 2 panchromatic and multispectral imager.

Table 2. WorldView 1 and 2 Spectral Band Edges and Center Wavelengths

Band Name	Center Wavelength (nm)	Minimum Lower Band Edge (nm)	Maximum Upper Band Edge (nm)
Panchromatic WV1	651	397	905
Panchromatic WV2	627	447	808
Coastal Blue	427	396	458
Blue	478	442	515
Green	546	506	586
Yellow	608	584	632
Red	659	624	694
Red Edge	724	699	749
NIR1	833	765	901
NIR 2	949	856	1043