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 50% response upper and lower edges and center wavelengths for each.

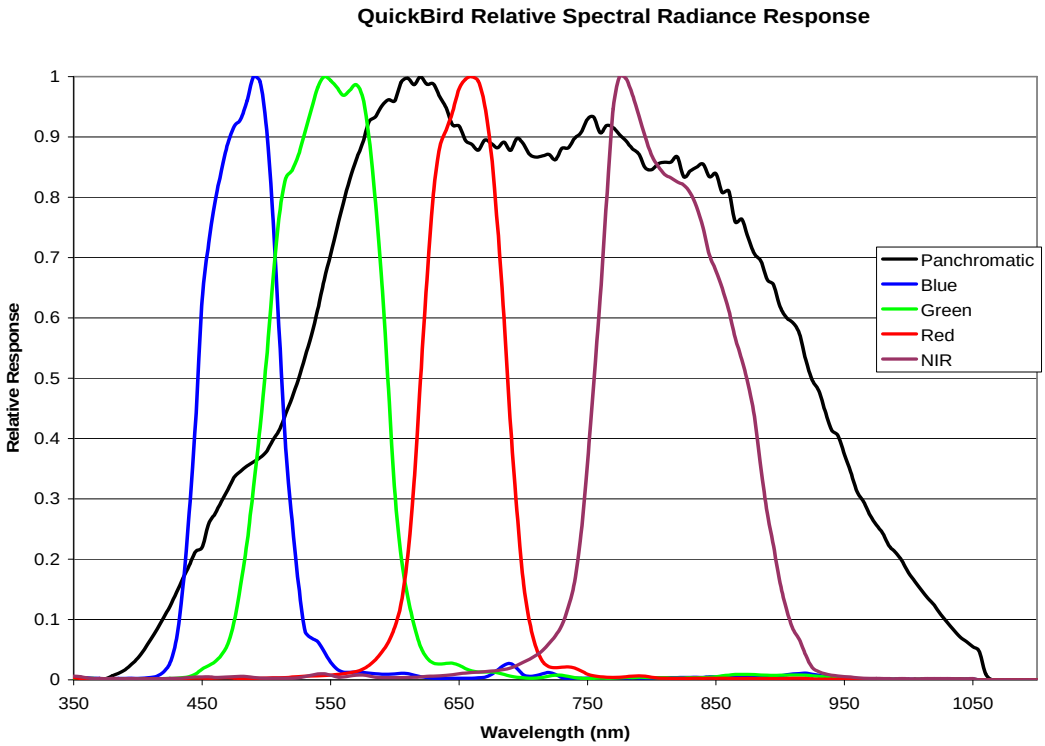

Figure 1. Spectral Response of the QuickBird panchromatic and multispectral imager.

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	725	525	925
MS1 (Blue)	479	447	512
MS2 (Green)	547	499	594
MS3 (Red)	654	620	688
MS4 (NIR)	814	755	873

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.

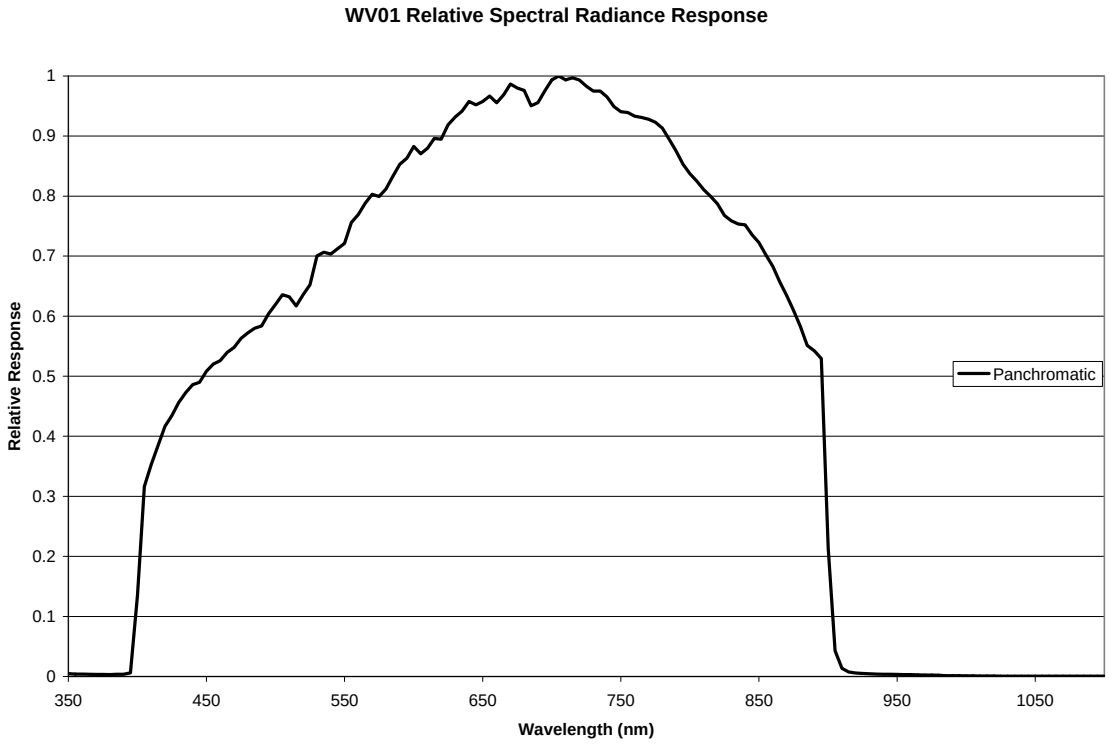

Figure 2. Spectral Response of the WorldView 1 panchromatic imager.

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 908 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 50% response upper and lower edges and center wavelengths for each band for both WorldView 1 and WorldView 2.

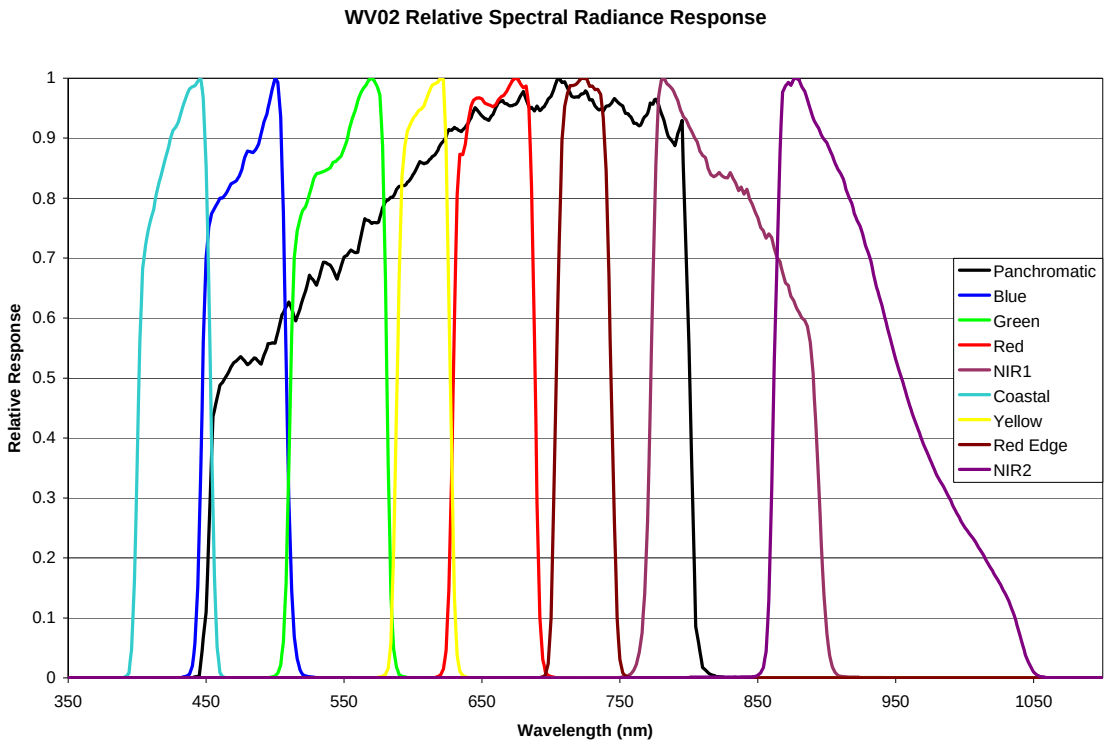

Figure 3. Spectral Response of the WorldView 2 panchromatic and multispectral imager.

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	671	448	895
Panchromatic WV2	632	464	801
MS1 (NIR 1)	831	772	890
MS2 (Red)	659	629	689
MS3 (Green)	546	511	581
MS4 (Blue)	478	447	508
MS5 (Red Edge)	724	704	744
MS6 (Yellow)	608	588	627
MS7 (Coastal)	427	401	453
MS8 (NIR 2)	908	862	954