



Products
& Services

WORLDVIEW-1

BEST RESOLUTION, ACCURACY, AGILITY



Offering panchromatic imagery at 50 cm resolution, DigitalGlobe's WorldView-1 is the highest resolution commercial earth-observation satellite now operating.

With unprecedented accuracy giving map ready imagery – 1:12,000 US scale or better – right off the satellite, while exceptional agility means acquisition of multiple targets on each pass and faster collection, up to 750,000 km²/day. Combined with QuickBird and WorldView-2 (to be launched in 2008) it will be part of a constellation offering very high revisit and large area collection capacity.

Technical
Summary

LAUNCH	September 18, 2007
ORBIT	496 km altitude; sun-synchronous, 94.6 minutes
NOMINAL SWATH WIDTH	17.6 Km at nadir
ON-BOARD STORAGE	2,200 Gbit
DYNAMIC RANGE	11 bits per pixel
RESOLUTION	PANCHROMATIC 0.5 metres at nadir, 0.55 metres at 20° off-nadir
SPECTRAL BANDWIDTH	400—900 nanometers
ACCURACY	CE90% 6.5 m
AVERAGE REVISIT	5 days
SINGLE-PASS MONOSCOPIC AREA COVERAGE	1 area of 60 x 110 Km
SINGLE-PASS STEREOSCOPIC AREA COVERAGE	1 area of 30 x 110 Km

Products

Imagery products are offered at these levels:

- Basic 1B (Level 1)
- Basic Stereo Pairs (Level 1)
- Standard 2A (Level 2)
- Ortho-Ready Standard OR2A (Level 2)
- Orthorectified (Level 3)

Panchromatic (400–900 nanometer) imagery is collected in 11-bit format (2048 gray levels) and delivered in 16 bit format for superior image interpretation (shadow detail, etc.), or 8-bit format (256 gray levels) supported by GIS and mapping applications.

Basic 1B Imagery Products (Level 1)

Basic Imagery products are the least processed of the WorldView-1 Imagery Products. Each strip in a Basic Imagery order is processed individually; therefore, multi-strip Basic Imagery products are not mosaicked.

Processing: Basic Imagery products are radiometrically corrected and sensor corrected, but not projected to a plane using a map projection or datum. The sensor correction blends all pixels from all detectors into the synthetic array to form a single image. The resulting GSD varies over the entire product because the attitude & ephemeris slowly change during the imaging process.

Physical Structure: Basic Imagery products are delivered at full swath width, cut into 14km lengths. Full strip width is 17.6 km at nadir; the area that this width represents on the ground depends on the collection parameters (off-nadir angle, orientation of collection, etc). Note that depending on area ordered, the length of the last piece could be less than 14 km. There will be at least 1.8 km overlap between each 14 km length delivered.

Basic Stereo Pairs (Level 1)

Basic Stereo Pairs are supplied as two full scenes (490 km²) with 90% overlap, designed for the creation of DEMs and derived GCPs.

Standard 2A (Level 2)

Standard Imagery products are processed to a further extent than Basic Imagery. They are more suitable for users that require imagery in a familiar ground-based coordinate system (such as UTM Zone or State Plane).

Processing: Standard Imagery products are radiometrically corrected, sensor corrected, and projected to a plane using the map projection and datum of the customer's choice. All Standard Imagery products have uniform GSD throughout the entire product. If the order polygon crosses more than one strip, one product is made for each image strip that is used to fulfill the order. As the Standard Product is not mosaicked, one product will be delivered for each strip.

Standard Imagery has a coarse DEM applied to it, which is used to correct for topographic relief with respect to the reference ellipsoid. The degree of normalization is relatively

small, so while this product has terrain corrections, it is not considered orthorectified.

Ortho Ready Standard OR2A (Level 2)

Ortho Ready Standard Imagery: Ortho Ready Standard Imagery has no topographic relief applied, making it suitable for custom orthorectification. Ortho Ready Standard Imagery is projected to an average elevation, either calculated from a terrain elevation model or can be supplied by the customer. It can be ordered from a minimum of 25 km² from the Library, or from 64 km² for new tasking.

Orthorectified (Level 3)

Orthorectified Imagery products are GIS-ready and are used as image base maps for a wide variety of applications that require a higher degree of absolute accuracy.

WorldView-1 Orthorectified imagery product accuracies.

Product Level	CE90	RMSE
ORTHO 1:12,000	10.2-meters	6.2-meters
CUSTOM ORTHO	Accuracy determined by the accuracy and quality of customer-supplied support data	

Processing: Orthorectified Imagery products are radiometrically corrected, sensor corrected, and orthorectified with a fine digital terrain model using the map projection and datum requested by the customer. For order polygons that require more than 1 strip, customers have the option to have their products mosaicked into a single product.

Orthorectified Imagery products require DEMs to remove relief displacement. Ground Control Points (GCPs) can also be used to improve the absolute accuracy. Before an order for an Orthorectified Imagery product is accepted, DigitalGlobe will determine whether it has the appropriate support data to make the desired product. The accuracy of the DEMs and/or GCPs required to make each product depends on the scale of the Orthorectified Imagery product ordered.

Custom Orthorectified

These products use customer-provided support data to orthorectify WorldView-1 Imagery. There is no stated accuracy associated with the Custom Orthorectified Imagery product because the quality and accuracy of the finished product is directly dependent on the quality and accuracy of the support data. DEMs and GCPs are the most typical types of support data that customers provide.

Accuracy: Orthorectified products have an absolute geolocation accuracy, which varies depending on mapping scale.

Physical Structure: The delivered area for Orthorectified Products is the order polygon is black-filled to the Minimum Bounding Rectangle.



Accuracy

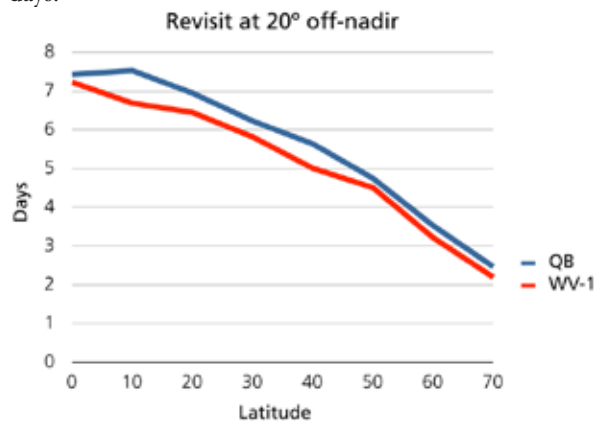
With a foreseen accuracy of 3–7m (CE90%) WorldView-1 provides map ready imagery right off the satellite, meaning a reduced need for costly GCPs and making orthorectification quicker and more accurate.

The expected geolocation accuracy using the initial attitude/ephemeris (available immediately after downlink) is 19 metres, while using the refined attitude/ephemeris (available within 2 hours of pass) it is 5 metres. Pointing accuracy is less than 500 metres.

Agility

With a slew time of 7 seconds across 200 km WorldView-1 can look forward, back, East and West to acquire multiple targets per pass. Along with bi-directional scanning, this means much greater collection capacity, much faster collection of orders in high competition areas and efficient in-track stereo collection. The satellite can downlink and acquire data simultaneously and the onboard storage – 2,200 Gbits SSR – and high-speed downlink – 800 Mbps (dual polarization), redundant antennas – give improved collection capacity, four times that of QuickBird.

Average revisit (0–20° ONA @ 40° latitude target) is 5 days.



Single-pass monoscopic area coverage

1 strip of 650 km or 1 area of 60 x 110 km

Single-pass stereoscopic area coverage

3 strip x 55 km, 2 strip x 110 km or 1 strip x 220 km

Product structure, cloud cover, ordering

See the QuickBird section of this *Guide* for details of supplied Image Support Files, ordering options, cloud cover policy and tasking levels.

Note that Assured and Single Shot Tasking are not available for WorldView-1.

File formats

WorldView-1 Imagery Products are available in the following file formats:

- GeoTIFF 1.0
- NITF 2.0
- NITF 2.1