

AVIATION WEEK

GeoEye-1 Expands NGA Image Base

Aviation Week & Space Technology
09/15/2008, page 36

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GeoEye-1's launch gives commercial, government users finer resolution

Printed headline: A Finer View

The imaging quality of commercial satellites is set to improve when GeoEye-1 comes on line in about a month.

A United Launch Alliance Delta II 7420 carried the 4,310-lb. satellite into a 423-mi. highly inclined orbit Sept. 6 from Vandenberg AFB, Calif. After acquiring a signal 1 hr. 40 min. later, a 60-90-day instrument checkout and calibration period began.

Built by General Dynamics Advanced Information Systems in Gilbert, Ariz., GeoEye-1 carries an imaging system from ITT in Rochester, N.Y., that is to provide 16-in. resolution (0.41 meter) in black and white and 5.4 ft. in color.

Those resolutions will rank it as the best in the commercial industry. "It's an upgrade to our current capabilities," says David Burpee of the National Geospatial-Intelligence Agency (NGA). "The best we got from commercial in the past was 1 meter."



The high-resolution GeoEye-1 was launched from Vandenberg AFB, Calif., by a Delta II to serve the National Geospatial-Intelligence Agency, Google and foreign customers. Credit: WILLIAM G. HARTENSTEIN

NGA is a huge consumer of images from GeoEye's first spacecraft, the 10-year-old, 0.8-meter black-and-white/4-meter color resolution Ikonos, and rival DigitalGlobe's WorldView-1, which was launched last September. Primarily, its users want a broad mapping capability.

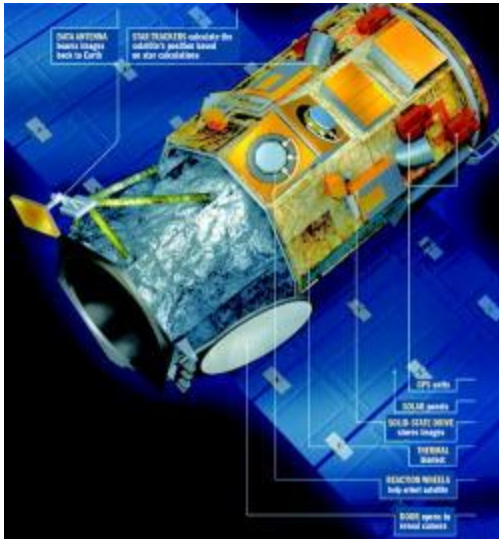
Everyone in the government—easily defined as those with a .gov or .mil in their e-mail address—has access to the imagery. It's not sold directly to the public but is made public (particularly to state and local government agencies) for large-scale mapping exercises through federal agencies.

Some users have authority to request images. To fulfill those requirements, the NGA may tap into classified spacecraft, its commercial suppliers or aircraft assets such as Predators or Global Hawk unmanned aerial systems. Higher resolution black-and-white images are most in demand.

“The fact that these [commercial] images are unclassified means we can use them immediately, as we are for Hurricane Ike,” says Burpee. Under those circumstances, federal emergency agencies may use images to identify specific landmarks where response is needed or the public needs to be warned about.

In cases where classified resources are tapped, a “derived product” is produced that reduces the resolution to well below the 1-meter level. Such images cannot be “reverse engineered” to restore the original resolving power.

While WorldView-1 and Ikonos produce images that are close to GeoEye-1’s, the clarity of the newer spacecraft is distinctive, says Burpee. Half-meter resolution is what will be made available to the public.



“But GeoEye will be better than that for private [military/national security] imaging,” he says. “This allows us to continue to improve and enhance products that were already using commercial imagery [while] supporting a national policy of having a strong and robust commercial remote-sensing industry.”

The agency is the central imaging repository for U.S. civilian and military agencies and GeoEye’s largest customer under NGA’s NextView program, which financially backs advanced commercial Earth-imaging satellite architectures.

WorldView-1 was first to receive NextView funding and proved to be the pathfinder for a much quicker resolution of the GeoEye contract, says Burpee. “We took pains to make sure that the business model in our contract would not hinder their corporate business model.”

General Dynamics built GeoEye-1, which uses an ITT imaging system. Credit: SATELLITE IMAGING CORP

During the past five years, the NGA has invested \$1.5 billion to improve its commercial imaging capability, including a combined \$1 billion to GeoEye and DigitalGlobe. Of that funding, NGA’s check paid about half the satellite’s development costs of \$237 million. It also assured imagery at discounts.

“Taxpayers are getting images at 50-cents on the dollar as opposed to government-developed satellites,” says GeoEye Chief Executive Matthew O’Connell.

The mission’s cost—including launch, insurance, development of four ground stations and the satellite—was put at \$502 million, according to the company.

O’Connell says the company’s other big clients are Google, whose presence was trumpeted by a logo on the Delta II, and clients in Japan, Singapore, Turkey and Germany. GeoEye-1 will operate in tandem with Ikonos. GeoEye’s third satellite, OrbView-2, offers 1-km. (0.62-mi.) resolution and is used for wide-field-of-view imagery.

Google licenses imagery from DigitalGlobe, Spot Image and GeoEye as part of its Google Earth service. “Every month some part of the world is updated,” says Google’s Kate Herlowitz.

For most users, the service is free, but those wanting advanced resolution, especially for detailed printouts, pay fees to use Google Earth Pro. ITT’s imaging system will allow GeoEye to spot an object the size of a home plate on a

baseball diamond and to locate such an object within about 9 ft. Revisit times are just three days, even less if a reduced resolution is acceptable.