

# ARCHIVED REPORT

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## RapidEye

### Outlook

- Planet appears to have no plans to continue development of the RapidEye+ system; instead, it will use its network of Dove and SkySat spacecraft to meet customer needs
- BlackBridge, acquired by Planet Labs in October 2015, will continue operations of its RapidEye fleet
- BlackBridge secured financing in May 2014 to begin development of RapidEye+ constellation
- In 2013, RapidEye owner, Iunctus Geomatics Corp, changed its name to BlackBridge Geomatics Corp

### Orientation

**Description.** RapidEye is a constellation of five satellites designed for rapid delivery of multispectral imagery to the agricultural and mapping industries.

**Sponsor.** RapidEye is based in Berlin, Germany. It is owned by Planet Labs of San Francisco, California.

**Status.** RapidEye is operational.

**Total Produced.** Five.

**Application.** RapidEye provides medium-resolution multispectral imagery data serving the oil, gas, and mining; mapping; flight simulation; forestry; agriculture; environment; and security markets.

**Price Range.** The cost of the five RapidEye satellites and the related ground equipment is estimated at \$206 million, with each satellite costing around \$20 million.

### Contractors

#### Prime

<b>MacDonald, Dettwiler and Associates Ltd (MDA)</b>	<a href="http://mdacorporation.com/">http://mdacorporation.com/</a> , 13800 Commerce Pkwy, Richmond, British Columbia, Canada, Tel: + 1 (604) 278-3411, Fax: + 1 (604) 231-2750, Email: <a href="mailto:info@mdacorporation.com">info@mdacorporation.com</a> , Prime
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#### Subcontractor

<b>Jena-Optronik GmbH</b>	<a href="http://www.jena-optronik.de">http://www.jena-optronik.de</a> , Pruessingstrasse 41, Jena, Germany, Tel: + 49 3641 200 110, Fax: + 49 3641 200 222, Email: <a href="mailto:info@jena-optronik.de">info@jena-optronik.de</a> (Imager)
<b>PCI Geomatics</b>	<a href="http://www.pcigeomatics.com">http://www.pcigeomatics.com</a> , 50 W Wilmot St, Richmond Hill, Ontario, Canada, Tel: + 1 (905) 764-0614, Fax: + 1 (905) 764-9604 (Core Image Analysis Software)

## RapidEye

<b>RUAG Space AB</b>	<a href="http://www.ruag.com/space/">http://www.ruag.com/space/</a> , Solhusgatan 11, Göteborg, Sweden, Tel: + 46 31 735 00 00, Fax: + 46 31 735 40 00 (X-Band Helix Antennae)
<b>Surrey Satellite Technology Ltd, SSTL</b>	<a href="http://www.sstl.co.uk">http://www.sstl.co.uk</a> , Surrey Space Centre, University of Surrey, Guildford, United Kingdom, Tel: + 44 0 1483 689278, Fax: + 44 0 1483 689503, Email: <a href="mailto:info@sstl.co.uk">info@sstl.co.uk</a> (Satellite Platform)

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; [rich.pettibone@forecast1.com](mailto:rich.pettibone@forecast1.com)

## Technical Data

**Description.** BlackBridge sells imagery data to governments and commercial companies around the world. Data is used for agriculture, vegetation and water quality monitoring, and land cover discrimination, as well as other purposes. The company sells multisource imagery, with data coming from its own RapidEye constellation as well as from the U.S. Landsat series of satellites and other commercial satellite operators. It focuses on broad area mapping and change monitoring, with images updated once per month.

**Design Features.** RapidEye spacecraft use the SSTL-150 platform. The power system consists of nine deployed solar panels and battery charge regulators. It also includes three 6Ah battery packs, a centralized power switching system, and a distributed power conditioning system. An unregulated 28V bus distributes and switches power.

The Orbit Control and Determination System contains a GPS receiver and a cold gas thruster system. These are also important parts of the Attitude Control and Determination System, which includes magnetometers, magnetorquers, horizon and sun sensors, and an offset momentum wheel system.

The RapidEye payload holds an optical package only and was built by Jena-Optronik based in Jena, Germany. The camera has a ground resolution of 6.5 meters, with

four to six multispectral channels. One camera covers a swath of 200 meters. The result is a less complex, lighter, and highly efficient system that has the capability to cover more than 4 million square kilometers (1.5 million sq mi) per day. The five-satellite configuration adds system redundancy in case of failure of an individual satellite. Existing ground stations are used to collect images.

The satellites are equally spaced in the same sun-synchronous orbit, and each is capable of performing an off-track rotation. The camera's imaging swath of approximately 150 kilometers, combined with an off-track angle of  $\pm 22^\circ$ , ensures daily global accessibility. The satellites can be redirected at any time through the telemetry, tracking, and command unit. A data handling and storage unit is situated on board each satellite, as is a high-speed X-band communications system capable of downloading the acquired images. The design lifetime of this first constellation is seven years.

Each satellite carries a CCD-based Earth imaging system that captures images in six spectral bands (including visible, near infrared, and panchromatic). Each system consists of two cameras, allowing the generation of images of up to 150 kilometers x 1,000 kilometers at a resolution of 6.5 meters.

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Based on SSTL-150		
<b>Weight</b>		
Weight	150 kg	330 lb
<b>Performance</b>		
Radiometric Resolution	>10 bit	
Spectral Bands	4-6, Visible and NIR	
Daily Revisit		
Swath	150-200 km	93-124 mi
Altitude	620 km	385 mi
Inclination	Sun-synchronous (97.8°)	
Spatial Resolution	5-7 m	16.4-22.96 ft
Design Life	7 yr	



Rendition of the RapidEye Constellation

Source: MDA

## Variants/Upgrades

**RapidEye+.** RapidEye+ was a planned five-satellite constellation expected to operate in 14 spectral bands (superspectral) with 1-meter per pixel resolution.

Reportedly, RapidEye+ would have been able to scan 5 million km<sup>2</sup> per day (significantly exceeding the current constellation's capacity of 4 million km<sup>2</sup> per day).

## Program Review

**Background.** RapidEye AG was established in 1998 with the goal of providing a geo-information system via four low-Earth-orbit mini-satellites. Although RapidEye's primary market is the agriculture industry, its product line benefits other industries and disciplines such as cartography, insurance, real estate development, and demography.

### *Contractors Selected*

When Surrey Satellite Technology Ltd (SSTL) was selected to build the spacecraft in February 2000, the company became an equity investor in the program.

In September 2002, MacDonald, Dettwiler and Associates (MDA) Ltd signed an agreement in principle to supply and launch the RapidEye constellation of Earth observation satellites and provide the related ground systems infrastructure in Germany. MDA and RapidEye worked together on marketing and product development as well as financing. The supply project was valued at approximately \$100 million. Surrey Satellite built the spacecraft platforms based on its SSTL-150 model.

Funding for the \$206 million RapidEye constellation was finally secured in 2004 when the company received a loan from a banking consortium led by KfW Group

and Commerzbank of Germany and Export Development Canada. The loan was guaranteed by the German state of Brandenburg, which itself provided EUR37 million to the program. In addition, the German Space Agency contributed EUR15 million.

All five RapidEye spacecraft were launched in August 2008 on board a single Dnepr rocket.

In April 2009, MDA announced plans for a next-generation RapidEye constellation with half-meter resolution. MDA planned to build a large network of low-cost satellites, with a total cost between \$100 million and \$210 million. However, sales at RapidEye remained disappointing. Lack of long-term contracts with national government agencies put the company at a disadvantage in the marketplace. Furthermore, a few sales that did not materialize in 2010 meant the company recorded revenue of only EUR11 million instead of an anticipated EUR25 million. As a result, RapidEye was not able to make payments on a number of its loans. In June 2011, RapidEye filed for bankruptcy protection, hoping to restructure its debt and continue operations.

### *RapidEye Purchased by Iunctus*

In August 2011, Iunctus Geomatics Corp, a Canadian satellite imagery distributor, purchased RapidEye.

## RapidEye

Specific details were not disclosed, but Iunctus Geomatics has continued operations at RapidEye. RapidEye closed out 2011 with the signing of three contracts: one with the U.S. National Geospatial-Intelligence Agency (NGA), one with the European Space Agency (ESA), and one with the Chinese Ministry of Land and Resources (MLR). The company is estimated to have generated EUR35 million in revenue in 2011. In November 2013, Iunctus changed its name to BlackBridge.

In May 2014, the Bank of Montreal provided BlackBridge with a CAD22 million (\$17.6 million)

loan, which was secured by the Business Development Bank of Canada. The loan was planned to be used to partially fund development of a fleet of five new satellites called RapidEye+.

Planet Labs purchased BlackBridge in July 2015, and the deal was closed in October. Planet Labs will benefit from BlackBridge's customer relationships and its archive of imagery. Planet Labs appears to have no plans to continue development of the RapidEye+ constellation. Instead, the company will serve customers with its own constellations of Dove and SkySat satellites.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Dec	1998	RapidEye AG formally established
Feb	2000	RapidEye AG enters agreement with SSTL as prime for EO mini-satellite network
Sep	2002	MDA named new RapidEye prime contractor, SSTL relegated to role of platform provider
Jun	2004	RapidEye funding finalized
Aug	2008	Launch of all five RapidEye spacecraft on a Russian Dnepr rocket
Jun	2011	RapidEye files for bankruptcy
Aug	2011	Iunctus Geomatics Corp of Canada purchases RapidEye
Nov	2013	Iunctus renamed BlackBridge
Oct	2015	Planet Labs purchases BlackBridge

## Forecast Rationale

Planet (formerly Planet Labs) purchased BlackBridge, along with the RapidEye satellite constellation, in 2015. The merger was a smart move by both companies.

RapidEye was founded in the late 1990s with a goal of operating a network of smaller satellites – a mission similar to Planet's. RapidEye remained a small player in the satellite remote sensing market, which was dominated by operators of larger satellites, such as DigitalGlobe and Airbus. RapidEye declared bankruptcy in 2011, and was purchased by BlackBridge later that year. The RapidEye constellation needed cash to continue operations.

With the rise of CubeSats, the satellite industry is now undergoing a major transformation. Companies like Planet are taking RapidEye's small satellite concept to the next level. Instead of a network of five 150-kilogram

satellites, Planet operates a network of hundreds of Dove satellites and a dozen SkySat satellites.

To achieve its goal of becoming a major player in the remote sensing market, Planet needed an image archive that could provide customer access. BlackBridge provided both. BlackBridge's RapidEye satellites also capture data in the so-called "red-edge" band – data that is especially useful for agricultural purposes.

BlackBridge's constellation of five satellites will remain operational until the late 2010s. While BlackBridge made plans to replace the satellites with an updated constellation called RapidEye+, Planet appears to have no intention to continue developing that system. Instead, it will use its network of Dove and SkySat spacecraft to meet customer needs. With no planned production of RapidEye satellites, this report will be archived.

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