

SCANNING THE HORIZONS

A Newsletter on Leading Edge Spatial Technologies

Government Issue

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GeoEye-1 New Offer

AAMHatch is pleased to announce the popular 'multi' product is now available for 50cm GeoEye-1 satellite imagery. 'Multi', already available for 80cm IKONOS imagery, allows clients interested in multiple captures over small areas to acquire the higher resolution and more accurate GeoEye-1 satellite imagery.

Challenge: Cost effective acquisition of imagery over multiple sites or over multiple dates

Solution: The popular 50cm resolution GeoEye-1 'multi' product

Benefits: The minimum new capture area of 100km² is slashed to only 50km² if the same site is imaged 3 times annually or 3 separate sites of 50km² are ordered at the same time. This equates to a 50% saving on each new capture order, while maintaining the same advantages:

1. 2km x 2km guaranteed cloud free area
2. 15% cloud free image assurance policy
3. Unparalleled horizontal accuracy of 3m (excluding terrain effects) on flat areas without ground control
4. 4 band multispectral imagery

For more information on satellite imagery, visit:

www.aamhatch.com/satellite or contact imagery@aamhatch.com

Client Testimonial:

"CTF Solutions has reached the milestone of acquiring more than 1,000,000ha of submetre resolution satellite imagery to undertake property planning and mapping. The majority of the high resolution satellite data we have utilised has been IKONOS multi site data, which we are sourcing from GeoEye's Australian Reseller, AAMHatch. Over the past year, AAMHatch has provided CTF Solutions with good advice and timely service, and we have been able to take good advantage of the cost-effective 'multi' product for our clients, both in Australia and internationally."

Tim Neale – Director, CTF Solutions



Above: Multi date images showing the change in eight months

Introducing RapidEye Satellite Imagery

Data from the world's largest constellation of optical imaging satellites is now available from AAMHatch. AAMHatch is the sole reseller of RapidEye products in Oceania including Australia, PNG, NZ, New Caledonia and other Pacific Island countries.

RapidEye has a constellation of five satellites capable of downloading over 4 million km² of imagery per day. The unique combination of large area coverage, high revisit capability, multispectral functionality (including the 'Red Edge') make this new information source compelling and valuable.

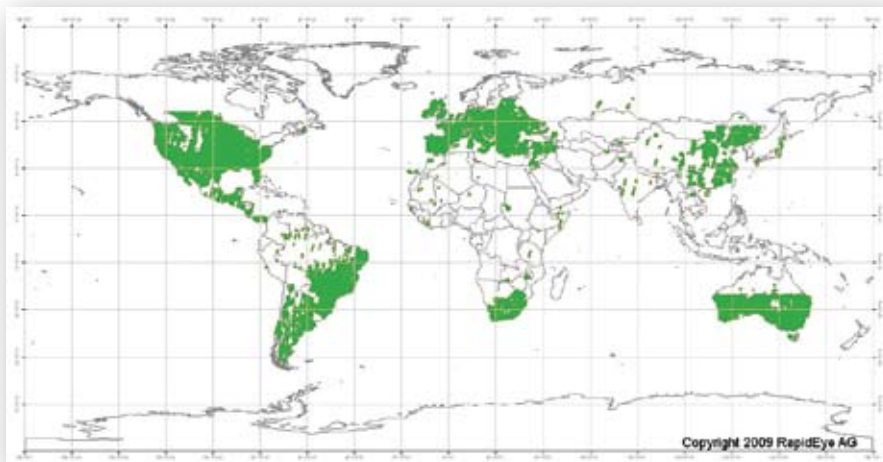
RapidEye Product Information

- Daily revisit capability
- Ortho corrected imagery with 5m pixel size
- Standard products have ~25m RMSE (enhanced with more control)
- 12 bit, 5 bands: Blue, Green, Red, Red Edge, NIR

Highlight your areas of interest to us and request future demo datasets via info@aamhatch.com



Above: RapidEye 5m resolution ortho image



Above: Overview of RapidEye's growing archive of satellite imagery (as of August 2009)

For more information on RapidEye satellite imagery, visit: www.aamhatch.com/rapideye

RapidEye's Business Areas include:

- Agriculture
- Forestry
- Security and Emergency
- Energy and Infrastructure
- Spatial Solutions
- Environment

RapidEye's Applications of Data include:

- Land Cover Analysis and Vegetation Identification
- Feature and Boundary Extraction
- Monitoring and Change Detection
- Damage Assessment
- Modelling and Product Estimation

Flood Risk Assessment

Council staff utilise 3D datasets for engineering planning, design and community consultation. These 3D datasets contain information about the height and location of features. In this case, the data is for use in a flood model around a town in rural New South Wales.

AAMHatch collected a 3D terrain dataset for the council using an aerial laser sensor (known as LiDAR or Aerial Laser Scanning). This new 3D terrain dataset measured terrain height at more than 44 million sites in and around the town. The density of the measurements can be seen in the image below.

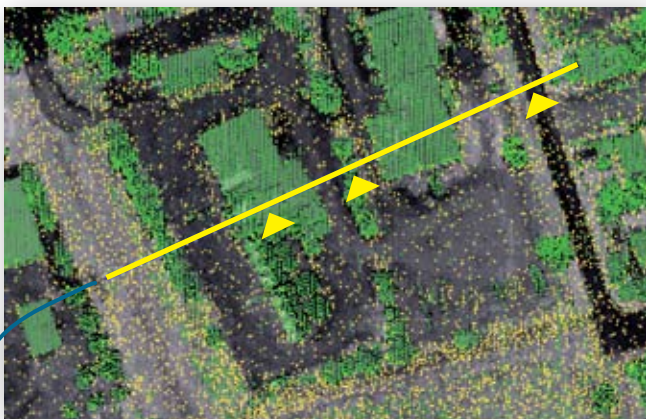
Engineers and Planners will be able to use this particular dataset knowing any measurements made will be within +/-15cm of their true position on open flat ground in 70% of cases. The statistical analysis to confirm this accuracy is calculated using all measurements taken over the entire project area.

This new aerial laser survey work had some benefits over land survey as the density of measurements was very high and the delivery of products rapid by comparison.

Aerial laser surveys can be undertaken to achieve a range of accuracies: better than +/-10cm vertical accuracy to 25cm or 50cm.

We deliver the terrain data to the accuracy your project requires.

For more LiDAR case studies, visit: www.aamhatch.com/lidar



Above: Yellow points show location of 'key terrain data'. Each 'point' is where measurement information is available. Green points show location of 'non terrain data' (vegetation, buildings, assets etc). Many more 'terrain point' measurements are collected, however, the council requested only key points in areas necessary to identify significant changes in terrain surface.



Above: The red line shows the location of the cross section below.

Below: The blue line shows the height of the levee at this location. In the image the orange points represent the original "all points" of ground data.

Below: Cross section – The orange (non ground) and black (ground) points provide a ground view of the yellow cross section shown in the above image.



GIS Metadata

Metadata are structured facts that describe information, or information services. Metadata facilitates many things beyond enabling information discovery and access; it also informs about the appropriate use of products and services.

The recently launched AAMHatch Metadata application (developed by the AAMHatch GIS and Software Development teams) produces metadata records which comply with the International Organization for Standardization (ISO) schema for describing geographic information and services (ISO 19115, ISO 19115-2 and ISO 19139). The details recorded pertaining to digital geographic data comprise:

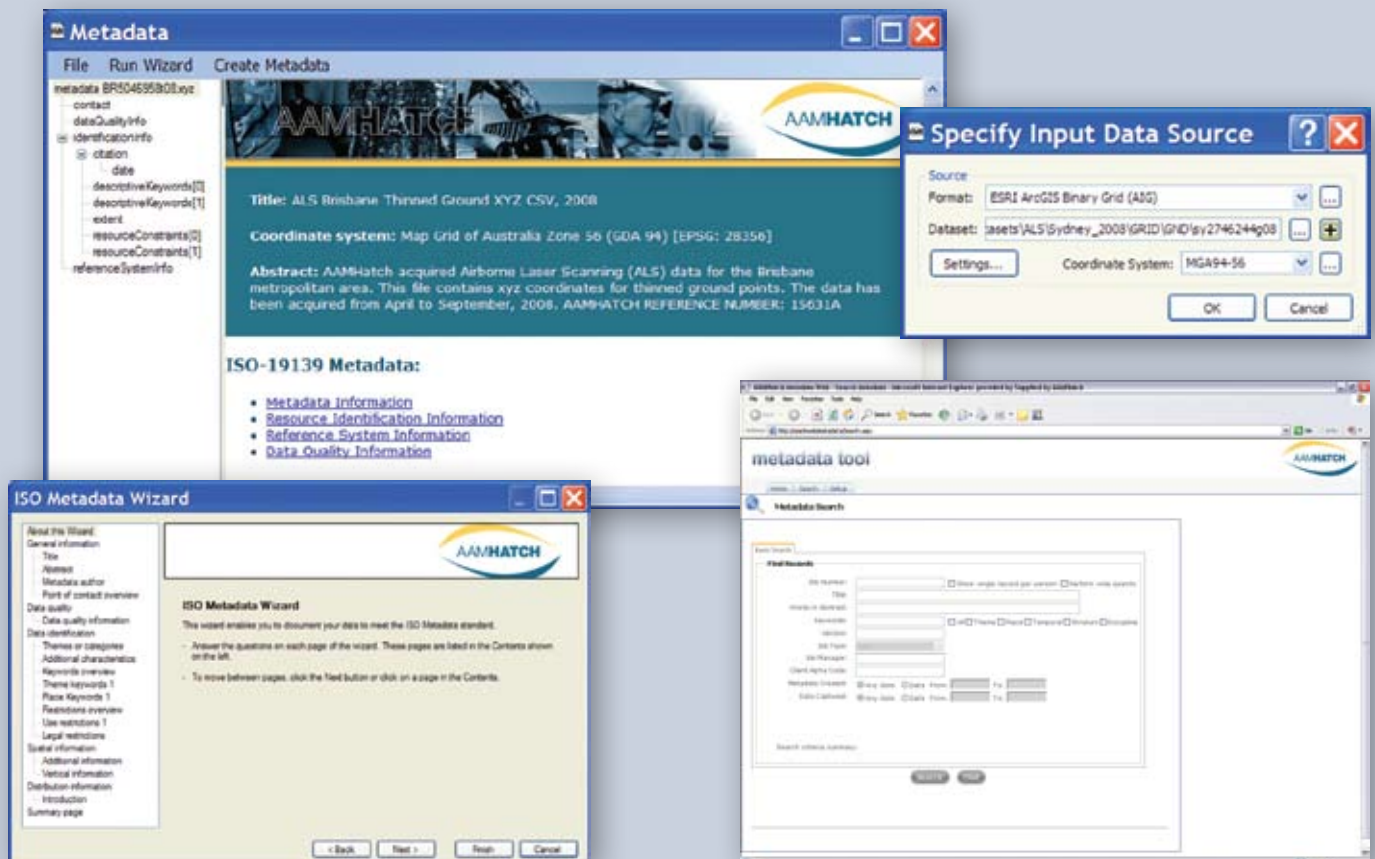
- Identification
- Extent
- Quality
- Spatial and temporal schema
- Spatial reference
- Limitations of use
- Distribution
- Properties of measuring equipment used to acquire data
- Geometry of the measuring process employed by the equipment
- Production processes used to digitise the raw data

ISO compliant metadata records are created for all spatial datasets produced by AAMHatch including 3D models, ortho photography, satellite imagery, digital elevation models and stereo vector mapping in a multitude of formats including:

- ASCII XYZ
- ESRI suite
- LAS
- MapInfo suite
- ECW
- GeoTIFF/TIFF
- JPG/JP2
- MrSID
- 3DS
- KML
- GML
- VRML
- DXF/DWG
- DGN
- Custom formats

The metadata records are catalogued in a database and supplied with data to provide a full description of each dataset. To enable easy searches and display of metadata in support of all spatial datasets, the metadata tool has an accompanying custom web interface available.

Enjoy the benefits of our professional services complete with metadata.



Current Aerial Projects of Note

Many clients ask us about our experience with large projects. Some recent examples demonstrate our capability.

LiDAR Project A

- 8,000km²
- +/- 15cm vertical accuracy
- >2pt/m² - point density
- 25.4 billion - points captured
- 1.5 terrabytes dataset

LiDAR Project B

- 908km²
- +/- 20cm vertical accuracy
- >1pt/m² - point density

Imagery Project A

- 48,227km²
- 21,302 frames of imagery
- 10cm, 25cm and 50cm GSD

Imagery Project B

- 1,720km²
- 3,800 frames of imagery
- 15cm GSD

Imagery Project C

- 11,460km²
- 2,196 frames of imagery
- 50cm GSD



Above: Recent 15cm imagery over the Gold Coast

GSD = ground surface distance/image resolution

For the latest project news, visit: www.aamhatch.com

Project Considerations for Aerial Survey

- Location
- Size
- Timelines
- Accuracy required
- Project phase
- Vegetation density / type
- Terrain type
- Weather
- Tidal issues
- Range of deliverables
- Format of products
- Budget

Data Sources and Common Product Features

Aerial Digital Cameras

- Image resolution ranges from 2.5 to 50cm
- Digital Terrain Model (DTM) vertical accuracy ranges from 5 to 50cm @ 1 sigma on clear ground

Airborne LiDAR

- Image resolution - integrated cameras from 15 to 40cm
- DTM vertical accuracy 10 to 50cm @ 1 sigma on clear ground

Satellite

- Image resolution down to 50cm
- DTM +/- 2m vertical accuracy @ 1 sigma on clear ground (with control)



Above: LiDAR point cloud of Sydney

GeoEye-1 Product Accuracy – Ortho Imagery and Terrain Data

An area of ~270km² was captured in stereo by the GeoEye-1 satellite for engineering design purposes.

The GeoEye-1 satellite was used to generate accurate 50cm ortho imagery and 2m contours over the site. The purpose of the imagery was for preliminary engineering design for an energy project.

Accuracies

Survey accurate ground control points, distributed evenly across the area, were used in the image processing. These points enabled consistent accuracies to be derived throughout the project area. The accuracies achieved after generating both the ortho image and the Digital Terrain Model (DTM) exceeded the client's and AAMHatch's expectations. In both vertical and horizontal planes, accuracy results of better than 50cm were achieved.

Contours at 2m intervals are normally created from a DTM with accuracy of 0.6m RMS. The GeoEye-1 DTM was found to have an accuracy of 0.39m RMS, which is equivalent to a contour interval of around 1.3m. These results were pleasing to both our client and GeoEye.

Users should note that in practice anyone can generate contours of any interval desired, however, these products may not be 'fit for purpose'. Clients should

be confident about how accurate their products are! From a purist view, the Australian National Standard for Spatial Data Accuracy specification states that DTMs can be used to create contours with an interval approximately 3.25 times the vertical accuracy of the DTM. The results will then conform to the standard of having 90% of the contours within half the contour interval.

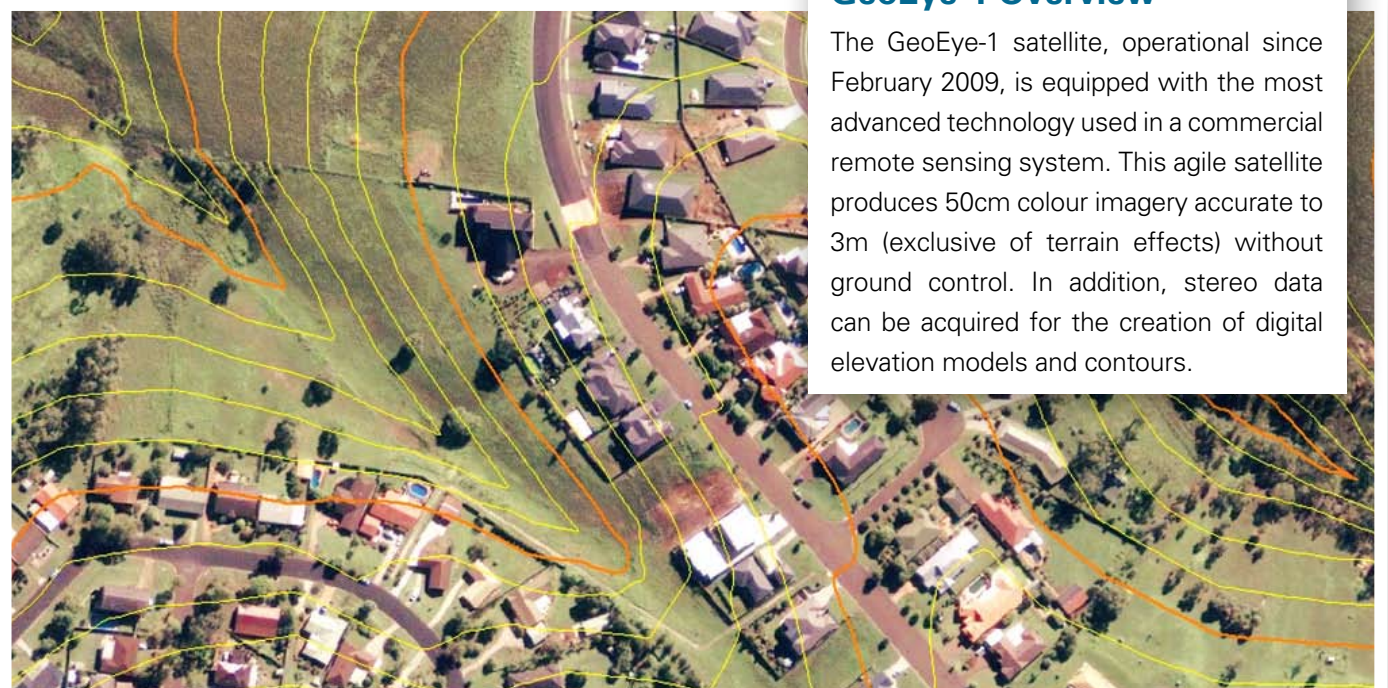
Client Feedback

"I have looked at the data and it looks great. The current format works perfectly with our design software. Very pleased with this format and the results it provides." Mark, Registered Surveyor.

Project Details

Area Size	~270km ²
Colour GeoEye-1 Stereo Pair	4 Band
Pixel Resolution (Panchromatic)	50cm
Client Supplied Ground Control Points	14
Independent Accuracy Check Points	47

For further information on satellite imagery, visit: www.aamhatch.com/satellite



GeoEye-1 Overview

The GeoEye-1 satellite, operational since February 2009, is equipped with the most advanced technology used in a commercial remote sensing system. This agile satellite produces 50cm colour imagery accurate to 3m (exclusive of terrain effects) without ground control. In addition, stereo data can be acquired for the creation of digital elevation models and contours.

Above: 2m contours over the site created from 50cm GeoEye-1 stereo satellite imagery (background image 50cm GeoEye-1)

Enterprise Geospatial Consulting

Our professional services team is responsible for enhancing our location services work and supporting our government clients in implementing geospatial technologies across the country. AAMHatch recognises that **the key to strategic geospatial initiatives** undertaken by government is to provide users and analysts, contractors and associated agencies, with **seamless, straight forward and timely access to fit-for purpose geospatial information.** AAMHatch sets about understanding the best methods and technologies to achieve this.

AAMHatch has a strong track record of engineering enterprise desktop and web based mapping solutions for government and commercial clients. The AAMHatch professional services team is able to design, implement and maintain solutions by employing best practice standards, technologies and quality assurance processes.

AAMHatch has proven knowledge in developing and implementing spatial data infrastructure for government

agencies. In particular, we are experienced with quickly obtaining an understanding of an organisation's business requirements and issues they face that have a spatial context. From that, AAMHatch can recommend and implement appropriate technical solutions that meet the desired outcomes of the customer, along with their budget.

AAMHatch can assist clients in:

- Strategic planning
- Detailed business case development
- Return-on-investment analysis
- System design
- Implementation plans for all types of geospatial systems

For more information on enterprise geospatial consulting, email: info@aamhatch.com

Microsoft
CERTIFIED
Technology
Specialist

Microsoft® Virtual Earth™6.0, Developing Applications



Above: A screenshot of the online **ACT Cycling and Walking Map** developed by the AAMHatch professional services team

3D City Models and Oblique Imagery for Scenario Modelling

A number of Australian and New Zealand cities have commissioned high definition LiDAR derived, digital terrain models and image derived, 3D city models to bolster their operational and strategic planning. 3D city models offer greater realism and detail to the various climate change scenarios being envisaged, and are valuable in the evaluation of development applications and related tasks. Sydney, Melbourne, Geelong and Wellington are some of the cities that have commissioned these 3D models from AAMHatch.

The City of Greater Geelong in Victoria chose a 3D solution. The solution has been installed and includes a fully textured 3D model of the Geelong Central Activity Area covering approximately 5km², and Pictometry® oblique aerial imagery covering the entire extent of the urban areas of Greater Geelong including towns of the Bellarine Peninsula. The Pictometry oblique georeferenced photography facilitates measurements of height, distance and area directly from the imagery.

This solution has been installed on Geelong's Citrix Server system making it potentially available to many staff. The 3D model produced from the Pictometry oblique photography integrates with Geelong's ESRI GIS via K2vi 3D Visualisation. This provides access of the 3D model to many viewers and allows for discrete analysis functions such as shadow and line-of-sight, which are required for development assessment and master planning.

For more information on 3D city models, visit: www.aamhatch.com/3dcitymodels



Right: Inundation simulation of Hobart
Below: 3D building model in Geelong

