

# SCANNING THE HORIZONS

The Newsletter on Leading Edge Spatial Technologies

AAM Pty Ltd's Technology Transfer continues as our Australian, South African and Malaysian offices share staff and experiences.

AAM recently had an urgent LiDAR project in North Western Australia where it was more efficient to send a Malaysian aircraft than to mobilise a unit from Eastern Australia. AAM's Malaysian LiDAR Operator, Shahrul Nizam Bin Ali Basah swapped the tropics of Malaysia for the desert of Northern Australia. By all reports, teh tarik and nasi lemak were hard to come by in the outback mining town, which was more renowned for inch-thick steaks. Shahrul was confronted by 42 degree heat and strong desert winds ... neither are generally experienced in tropical Malaysia.

On another project, AAM's Senior LiDAR Analyst Azrul Ridzwan Bin Shamsul Bahri spent three weeks in a fellow ASEAN country, where data security requirements prohibited the removal of spatial data from the country. The project raised many challenges for Azrul to solve. Long nights and methodical problem solving skills were needed to decipher the field test point measurements and to understand the specific local geodesy and logistics.

Both Shahrul and Azrul did the Jalur Gemilang ("Stripes of Glory") proud, and gained valuable experience. Such deployments are important to ensure that AAM staff remain constantly challenged to develop their professional and technical skills.



# Malaysia LiDAR Data Available for Purchase

Maziana Muhamad

RS & GIS Consultancy Sdn Bhd and AAM Pty Ltd have used LiDAR in Malaysia since 2000 and have proven, in both private and government sectors, its capability and efficiencies.

This technology has been used in many applications, such as road design, flood mitigation, proposed pipelines, urban drainage and forestry around Malaysia.

RS&GIS and AAM are taking an innovative approach, making data more widely available with the creation of multiclient datasets. These datasets are now available for sale through RS&GIS. Available archived data is cost-effective, has high accuracy and is an intelligent solution to support various studies and projects. Figures 1 and 2 provide an overview of the data coverage.

Further requests can be made through:  
[info@resgis.com.my](mailto:info@resgis.com.my)

*The release of the data is subject to Malaysia Survey Department approval.*



Figure 1: LiDAR coverage over Peninsula Malaysia

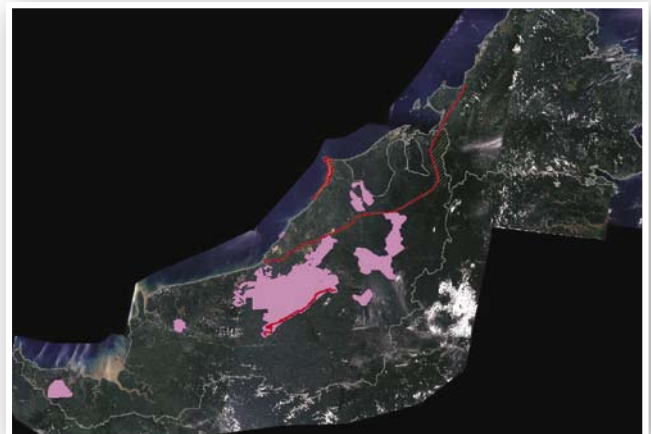


Figure 2: LiDAR coverage over East Malaysia

## Archived LiDAR and Ortho Data

- Malacca
- Kapar and Sungai Buloh
- Golok Catchment
- Terengganu
- Genting
- Kelantan
- Klang Valley

Other datasets available upon request

## AAM Name Change

On 1st March, AAMHatch Pty Ltd officially changed its name to AAM Pty Ltd. The name change coincided with our partner, Hatch Associates, exiting from its partial ownership in our company.

Why "AAM"? Our company was formed over 50 years ago and AAM stood for "Australian Aerial Mapping". As we now work outside of Australia and do much more than just aerial mapping, the full name is no longer appropriate. AAM has a reputation for high quality professional services so the "AAM" name was kept in its abbreviated form.



# Case Study: Pipeline Survey – South East Asia

Azrul Ridzwan Bin Shamsul Bahri

AAM Pty Ltd recently partnered with a local company to provide a LiDAR survey for a major pipeline construction task in South East Asia.

The project was challenging due to the client's short timelines for data capture combined with the requirement for highly accurate data products. The survey corridor stretched 350km from the coast to the international border. The terrain across the project provided a significant challenge given the dramatic changes in elevation from low lying coastline to mountainous hinterland.

The project was divided into two sections – the north corridor and the west corridor. This ensured the data capture task provided comprehensive coverage of the planned pipeline construction extent.

While the area of the project is large, acquisition of the LiDAR survey was done quickly. The acquisition was completed in 2 days, with the subsequent preprocessing, analysis and classification completed within 9 days.

The corresponding field survey by AAM's local partner provided a few issues as the State geodetic network did not support the high degree of accuracy required to check and datum the LiDAR survey. This is a common problem encountered by AAM, as we work in various parts of the

region and the LiDAR survey can be more accurate and more homogeneous than the geodetic network traditionally used to check. AAM and the local partner worked through these issues by returning to basic geodetic principles and upgrading connections between the field survey marks to international datums.

AAM was able to deliver the data within the required timeframe. The deliverables comprised a set of ground and non ground elevation points in addition to colour image frames for the client to produce orthophotos and topographic plans.

This project has shown AAM's ability to provide high quality data within short time frames. AAM's planning, costing, management, aviation, acquisition and processing teams offer their capability and experience to clients wishing to benefit from LiDAR expertise gathered on more than 500 LiDAR projects in more than a dozen different countries.

For more LiDAR case studies, visit:

[www.aamgroup.com/lidar](http://www.aamgroup.com/lidar)



Azrul Ridzwan, part of the AAM LiDAR team on site

## Case Study Overview

### Project Scope:

LiDAR capture of a planned pipeline project in South East Asia

### Project Size:

350km

### LiDAR Acquisition:

2 Days

### LiDAR Preprocessing and Classification:

9 Days

### Deliverables:

LiDAR point cloud and developed images

# SiteSeeV Application: Slope Monitoring and Assessment

Ahmad Farez Bin Dahlan

SiteSeeV™ is an efficient, high resolution 360° video system that has been used in Malaysia for the first time.

This technology uses a camera with a complex lens system that points in all directions, creating a 360° view range. Once this imagery is processed, it can generate a video that can be panned and zoomed at any angle. The video is geocoded and can be loaded directly into a GIS.

SiteSeeV offers comprehensive coverage of streets and towns and is not limited to major routes, as the system can be used on cars, planes, bicycles or by pedestrian. SiteSeeV can also be integrated with mobile mapping laser scanners which can produce georeferenced imagery.

Recently, AAM completed a SiteSeeV on an arterial road of Kuala Lumpur. It is the first successful utilisation of slope monitoring using SiteSeeV in the region.

The site location was along a stretch of the NKVE highway, spanning from the Duta toll to the Subang toll. The total return distance covered was 30.4km. The hill in focus (refer Figure 2) was the famous Bukit Lanjan area where a slope failure took place in 2003 which resulted in the closing of the NKVE expressway for 6 months. A team of 2 specialised technical personnel ran the operation. One person handled the transportation's mobility and safety, while the other handled the surveying hardware.

The desired timeframe for the survey was during off-peak hours to avoid traffic congestion and to have a clear view of the area. Due to its flexibility, the hardware could be placed on top of any stable platform and for this survey the spherical camera was mounted on a Perodua Myvi. The vehicle drove along the site at the nominated speed and maneuvered for optimal survey capture. Bukit Lanjan was scanned from the perspective of the road's point of view with the hill's peak and bottom thoroughly captured in the scenes. The survey took about 2 hours to capture and many hours of post-processing time to create the desired output video.

The project deliverable allowed the video route to be loaded into an ESRI GIS, which allowed single clicks to zoom to a specific road section which shows high resolution, interactive spherical video. This provides an ideal tool for those charged with managing corridor assets.

Phase 2 of AAM's SiteSeeV development sees the implementation of measurement tools to allow users to click on any asset in the video frame, and the coordinates and distances are displayed.

To view SiteSeeV videos, visit:

[www.aamgroup.com/360](http://www.aamgroup.com/360)

## Benefits of SiteSeeV

- Reduces the need for repeat site visits
- Gives an entire view of the area – above, below, left and right
- Able to zoom in on features
- Can be georeferenced
- Multiple capture platforms available – car, plane, bicycle, scooter, pedestrian



Figure 1: An unwrapped, 360° view of the highway



Figure 2: The NKVE highway, with the Bukit Lanjan hill



Figure 3: The SiteSeeV camera system mounted on the car capture platform



# Landcover Data Intelligently Extracted from Satellite Imagery

William Kiew Siong Ing

Satellite imagery and aerial photos provide valuable information for a range of sectors and industries.

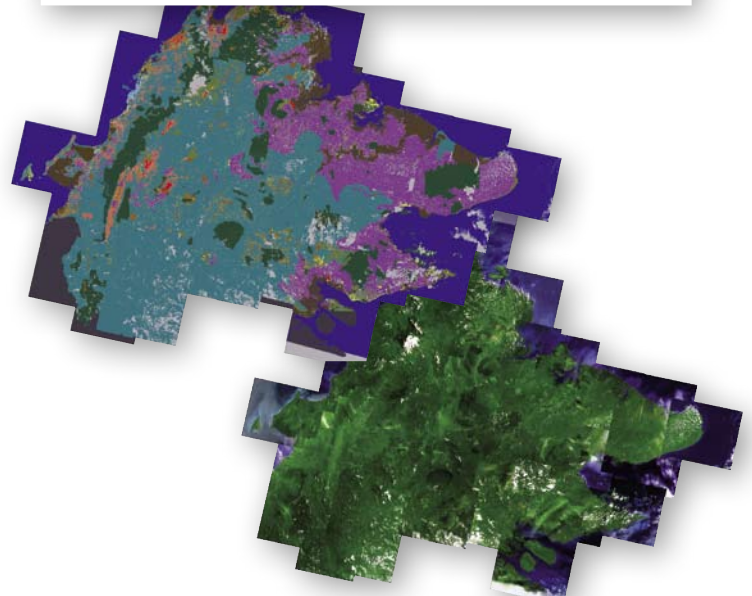
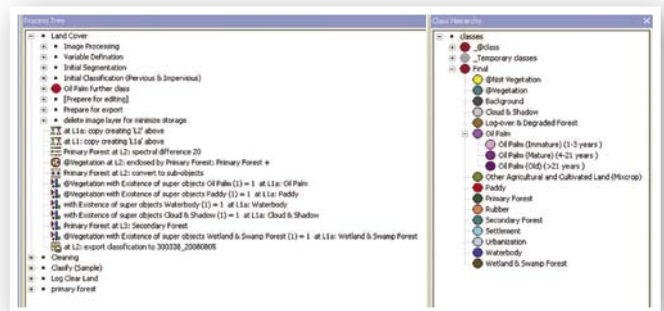
RS & GIS Consultancy Sdn Bhd recently worked with AAM Pty Ltd to map land cover for an entire State in East Malaysia. RS&GIS provided the personnel, local knowledge and processing expertise, with AAM's support on rule sets, software and processes.

46 scenes of SPOT5 data with 10m resolution were categorised into 13 main land cover classes and additional sub-classes for oil palm accordingly to their maturity. This semi-automated data extraction is based on the knowledge of staff and the rule set method developed. A combination of algorithms is deployed to examine the colour, pattern and context. The main challenge in classification is the spectral and radiometric quality of the image data. The spectral qualities of features are highly affected by cloud and haze. For this project, a special classification method was required and developed by the KL project team.

One of the final deliverables was a feature class attributed with key information such as area, perimeter and length. Ongoing research and development at RS&GIS and AAM is resulting in advances in our classification of land cover information. Once the rule sets are derived, these automated processes offer greater efficiencies and finer levels of details over traditional manual feature extraction methodologies.

For more satellite imagery information, visit:

[www.aamgroup.com/satellite](http://www.aamgroup.com/satellite)



## Geospatial Technology Update Seminar

AAM recently participated in the highly successful Geospatial Technology Update Seminar series organised by GIS Development.

AAM provided updates to seminar participants at full auditoriums at Jakarta, Hanoi and Kuala Lumpur regarding recent advances in a variety of geospatial acquisition techniques, including LiDAR, Pictometry® and SiteSee™.

The presentation from these seminars can be viewed at:

[www.gisdevelopment.net/gtus/presentation/AAMHatch.pdf](http://www.gisdevelopment.net/gtus/presentation/AAMHatch.pdf)



*Pictured: Maziana Muhamad and David Jonas presenting at the seminars*

# Development Applications Enhanced through Pictometry and K2Vi

Nils Matthews

Pictometry® is a visual information system for oblique aerial imaging. This system allows users to analyse high resolution images from multiple views at the click of a mouse.

Applications developed and derived from Pictometry imagery have the benefits of added extra functionality and intelligence to service a range of multi-disciplinary user requirements. The applications include: urban development mapping and management, emergency response, security, planning, engineering and visualisation.

The building geometry and texture can be mapped for 3D city model creation. The extraction process accurately generates clean 3D polygonal boundary representation models (wireframes). Geo-specific, photo-accurate texture maps are created from the source Pictometry imagery and are applied to the building geometry to add realistic surface detail to the wireframe models.

K2Vi software now adds a further suite of tools to 3D city models to assist with development planning and approval. This provides functionality for advanced data visualisation, modelling and analysis relevant for city planners to apply and maintain proper development controls. K2Vi complements the existing GIS infrastructure available to city planners. GIS software is used as the principal spatial data management tool, updating and adding new GIS data to and from the 3D visualisation environment. The K2Vi 3D visualisation software operates as an enhanced 3D simulation and capture environment of above-ground asset features, modelling a range of scenarios important to maintaining and evaluating the development codes that govern the physical environment



Figure 1: Control surface 1

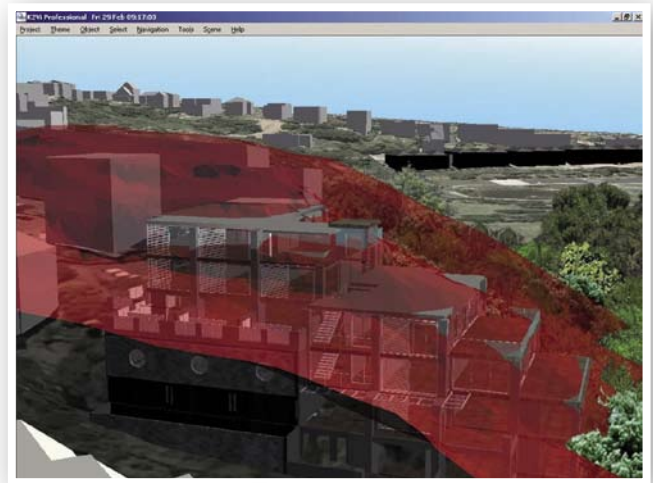


Figure 2: Control surface 2



Figure 3: Control surface 3

# Development Applications Enhanced through Pictometry and K2Vi... continued

Nils Matthews

and structure of a city. Thus helping to ensure that cities are maintained as a liveable and attractive environment for residents, businesses and visitors alike.

These development codes require consideration of many variables that can be modelled with K2Vi, including building simulation, visibility and shadow analysis and surface analysis. K2Vi gives city planners a suite of data manipulation, analysis and presentation tools to effectively apply these codes and present a range of simulated scenarios to document and support the decision-making process. Development applications can then be assessed in a more rigorous and considered environment to ensure codes are effectively and uniformly applied and the urban environment developed and maintained to a standard that is intended by city planners.

Some examples of K2Vi functionality to model and analyse height restrictions and control surfaces are shown in the surrounding figures:

- **Figure 1:** Control surface 1 is 2m along the lot boundary then up at 35 degrees – the proposed building exceeds the control surface
- **Figure 2:** Control surface 2 is 12.5m above ground level – the proposed building exceeds the control surface
- **Figure 3:** Control surface 3 is 8m above ground level – the proposed building exceeds the control surface
- **Figure 4:** Visibility analysis – used to analyse what can and cannot be seen from a location
- **Figures 5 and 6:** Building height controls – able to resize buildings interactively

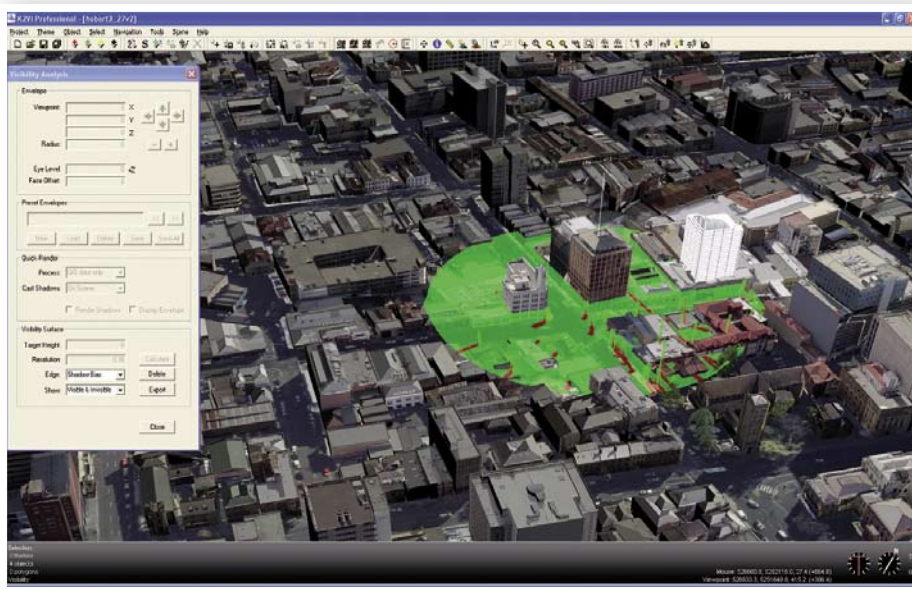


Figure 4: Visibility analysis

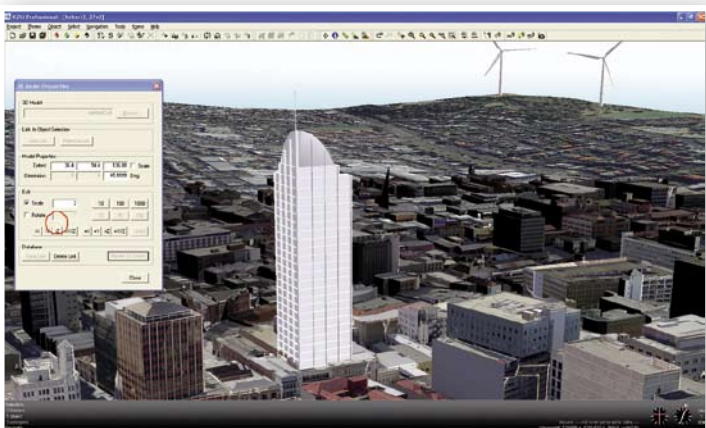


Figure 5: Building height controls

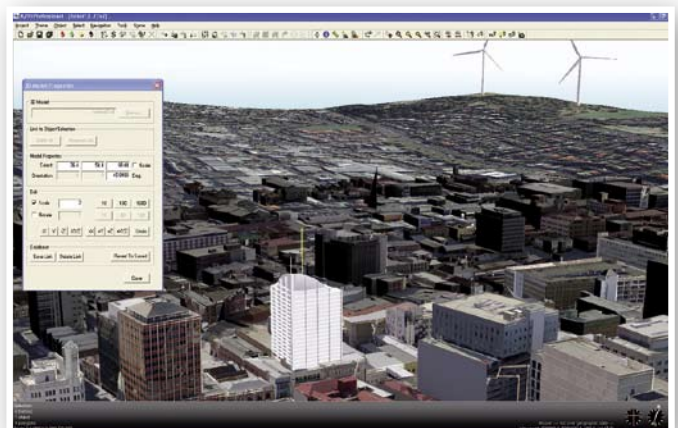


Figure 6: Building height controls – resizing buildings

For more Pictometry information, visit:  
[www.aamgroup.com/pictometry](http://www.aamgroup.com/pictometry)

For more 3D city model information, visit:  
[www.aamgroup.com/3dcitymodels](http://www.aamgroup.com/3dcitymodels)

# LiDAR and Orthophoto Coverage over Malacca

Jayaperiyah Subramaniam

RS & GIS Consultancy Sdn Bhd and AAM Pty Ltd are pleased to announce that LiDAR datasets and orthophotos are now available to purchase.

In 2009, RS&GIS and AAM completed the capture of a high accuracy topographic LiDAR survey and produced digital aerial photographs over the historical city of Malacca, the oldest city in Malaysia.

In the current economic times, mapping professionals are looking for ways to lower project costs. Now projects can enjoy the benefits from purchasing off the shelf,

high accuracy topographic LiDAR and high resolution orthophotos. This data can be useful and cost effective for various applications such as 3D city modelling, road and rail planning and design, asset management and planning, telecommunications and other engineering design tasks.

To purchase these datasets, email [info@resgis.com.my](mailto:info@resgis.com.my)



Above: Aerial view of the Oldest City in Malaysia, Malacca

Top Right: Enlarged view of the Maritime Museum and the Taming Sari

## Malacca Dataset

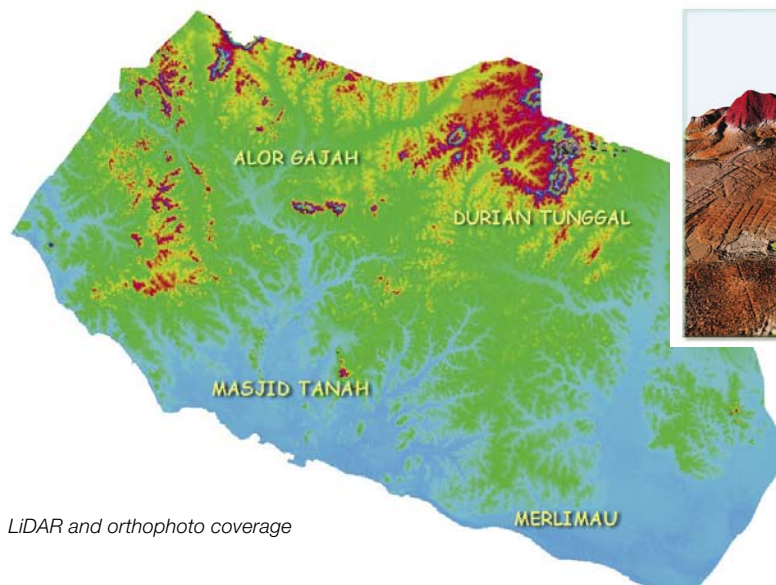
<b>LiDAR Sensor:</b>	ALTM Gemini
<b>Average Point Spacing:</b>	1.2m
<b>Vertical Accuracy:</b>	0.15m
<b>Orthophoto GSD:</b>	0.2m

### Data Available for Sale:

- Orthophotos
- Digital Terrain Model
- Digital Surface Model
- 1m Contours
- Intensity

LiDAR derived products such as drainage patterns, building outlines, road networks and others can be provided in formats suitable for use immediately in GIS and engineering/CAD packages.

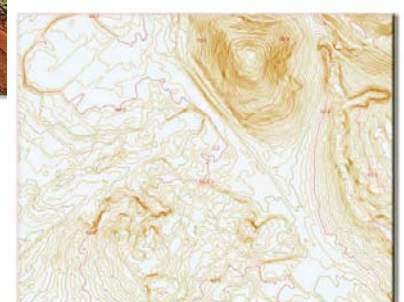
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LiDAR and orthophoto coverage



Digital terrain models



1m contour lines