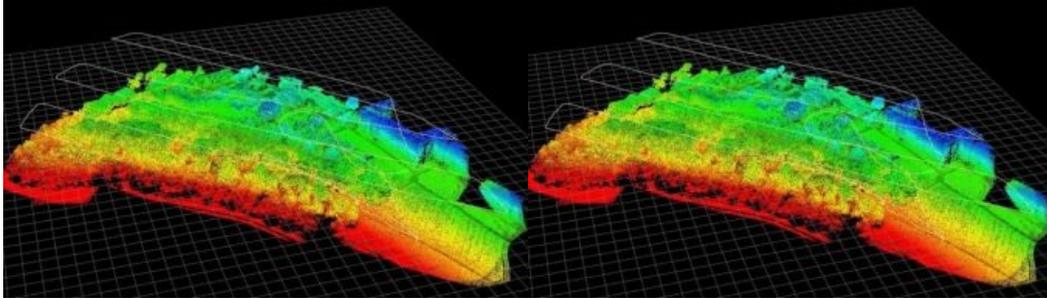


UAV Lidar to Monitor Landslides Safely



Unmanned Aerial Vehicle (UAV) Lidar offers unparalleled capability where accurate mapping is essential but difficult to achieve. In particular, hard to reach, hazardous environments where access is dangerous. Areas where there is dense vegetation and sites with inaccessible steep slopes. Landslide locations characteristically pose multiple problems. The landslide survey project at Ystalyfera

in Wales presented all of these challenges at the one site.

Undertaking a survey from the air using a drone ensured the survey team were not put in danger on the unsafe ground. It meant the team could survey the inaccessible steep areas safely. The vegetation penetration abilities of [Routescene's UAV LiDAR](#) system enabled the team to produce high-resolution Digital Terrain Models to analyse the area in detail. The team return to the site at frequent intervals to repeat the survey. Then compare and contrast the results over time to identify the rate and scale of ground movement across the landslide area.

A community in crisis – a history of landslides

Ystalyfera is a small town in Swansea Valley, South Wales, UK, with a population of around 3,000 people. Its geology and industrial past has made it prone to landslides for over 100 years. Since 1897, there have been over 45 incidents. The landslide system is very active and further instability is likely, possibly on a frequent basis.

Thousands of tonnes of rock, soil and trees slipped down the steep hillside in 2012. Movement in 2017 forced residents to be moved out of their terraced homes for their own safety. In 2019, the local primary school was closed for safety reasons when a geological survey was carried out.



Ystalyfera Lidar data with vegetation (Source: Routescene.com)

Specialist team to create 3D digital terrain models

In 2017, Routescene customer [Flythru](#), collaborating with [Geoterra](#), was employed by Neath Port Talbot County Borough Council and [Earth Science Partnership](#). Their brief was to create 3D Digital Terrain Models (DTMs) that would assist in monitoring any landslide movement on the hillside. They performed a Lidar survey of the village to establish and monitor land movements. This process continued in 2018.

Lidar advantages over photogrammetry for landslides

The landslide area to be surveyed at Ystalyfera was covered with dense vegetation. This was the critical reason for choosing UAV Lidar technology over other survey techniques. Unlike photogrammetry, which captures an image of the top of the vegetation, Lidar can penetrate through the vegetation to reach the ground and the features below. The [Routescene UAV LiDAR system](#) provides excellent performance for vegetation penetration. With a scan rate of up to 1.4 million points per second from 32 different lasers, it means many of the lasers hit the ground. Even through dense vegetation, up to 400 points per m2 can readily be achieved.

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