

## **Using Oblique Helicopter Lidar to Document Fluvial Reservoir Architecture: Examples from the Cretaceous and Tertiary of Eastern Utah**

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spatially constrained, outcrop data that can be used to measure sandbody geometries. Whilst very effective, the ground based surveying suffers from several drawbacks including: limitations on the range of the scanner; the oblique angle of measurement which can result in “scan shadows” and, the relatively time intensive data collection process. To address these problems a lidar system mounted obliquely on a helicopter has been used. This allows steep and inaccessible cliff sections to be mapped and scanning and the associated digital imagery to be obtained at optimal angles. Such data collection methods present a new set of challenges including issues associated with motion of the helicopter, which are addressed using an inertial navigation system, and the very large datasets that are produced. Cliff sections several hundred meters high and 10s of km long can be scanned in hours. New software has been developed to handle and process the datasets which include point clouds with millions of points and hundreds or even thousands of high resolution digital images. Once processed the resultant very large virtual outcrops, provide a unique insight to large scale sedimentary architecture.

The methodology and results will be illustrated with examples from three very large datasets from the fluvial part of the Cretaceous Blackhawk Formation and the Tertiary Green River Formation in eastern Utah. Over 60 km of outcrop has been scanned. Once processed the virtual outcrops have been used to extract geometrical data from several hundred individual fluvial sandbodies. This dataset provides a unique insight into lateral and vertical controls on large scale geometry and stacking patterns.