A landslide occurred in Malin, Maharashtra, India, on 30 July 2014 and affected an area of approximately 44,000 m².

**OBJECTIVES**

Landslide examination with latest point cloud generation and analysis capabilities.

Generation of an automated geospatial workflow for operational applications.

**RESOURCES**

Airbus DS WorldView® (pre-event) and Pléiades stereo image pair (post event).

**INTRODUCTION**

ENVI, ENVI LiDAR, IDL, and ArcGIS®.

**METHODOLOGY**

The ENVI task "GeneratePointCloudsByDenseImageMatching" was implemented to extract passive point clouds in LAS format from the panchromatic stereo datasets:

- A dense image matching algorithm is used to identify corresponding pixels in the two images.
- A block adjustment is applied to refine the 3D coordinates that describe the scene geometry.
- Additionally, the WorldDEM™ was input to constrain the range of heights in the matching area, and subsequently the length of the epipolar line.

**DATASETS**

- Pléiades 1A (incidence angle 21.8°), Pléiades 1B (incidence angle 1.9°), 8/9 Feb 2015.
- Pléiades 1A image, acquired 8 Feb 2015 (subset). Incidence angle 21.6°, GSD 0.5 m.
- Pléiades 1B image, acquired 9 Feb 2015 (subset). Incidence angle 1.9°, GSD 0.5 m.

**POINTER CLOUD GENERATION**

This automated point cloud generation and analysis can be embedded in virtually any existing geospatial workflow for operational applications.

Tested integration options are:

- Deployment within service-based information systems, notably ArcGIS®. This allows to make the application available to organizations through their Portal for ArcGIS® website.
- Published point cloud processing tasks as web-based services via the ENVI Services Engine (ESE) to existing enterprise infrastructures or cloud solutions.
- General implementation in geospatial workflows using the IDL bi-directional Python bridge.

**CONCLUSION**

Based on stereo satellite imagery, point clouds of high precision and density distribution can be obtained in a few minutes to support the operational monitoring of landslide processes.

The simple implementation in online services with the technology of Harris and ESRI makes it possible to calculate and retrieve tailored individual analyses for user-defined areas on the fly.

**REFERENCES**

Harris Geospatial, Boulder, CO, U.S.A. – patrick.collins@harris.com

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