

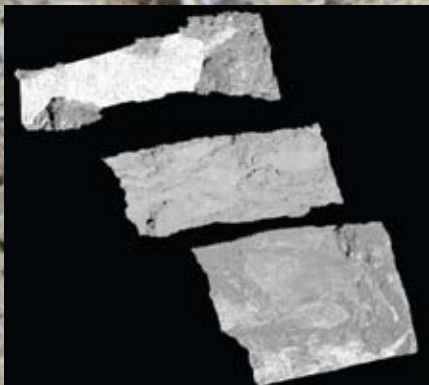
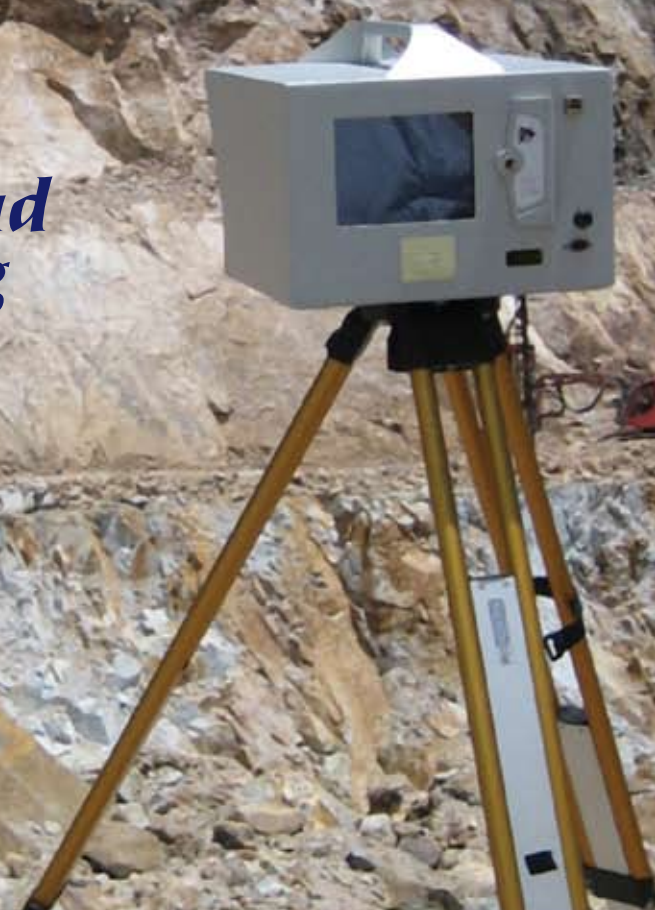
# SPLIT ENGINEERING

Digital Image Analysis Systems • Software • Service

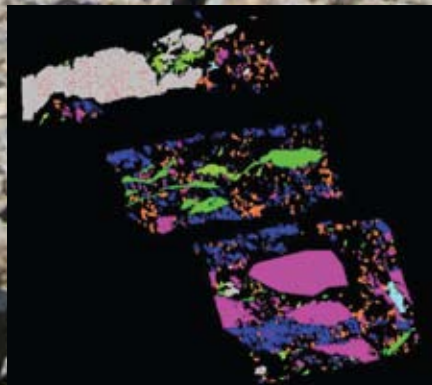


## *Point Cloud Processing Software*

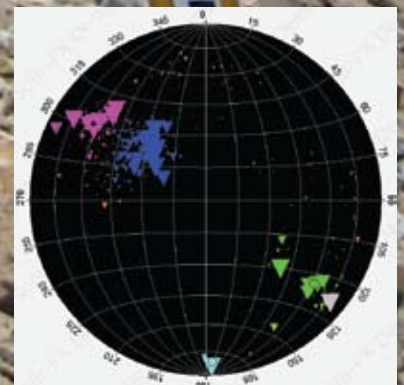
**Geotechnical Analysis  
Using Modern 3D Imaging  
Technologies**



Point Cloud



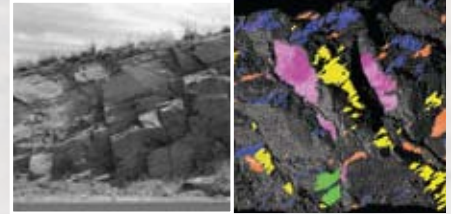
Automated Fracture Delineation



Stereonet

## What is Split-FX®?

Split-FX is a software package to process point clouds from LIDAR scans and photogrammetry. The software can view and edit point clouds, view digital images, create triangulated meshes, register point clouds, create 3D photodraped images and perform general point cloud measurements of distance, area and volume.



## Why use Split-FX®?

Split-FX is the only point cloud processing software designed specifically for geotechnical applications. It has many features specifically for the geotechnical analysis of rock and soil exposures, including:

- Automatically delineate rock fracture surfaces and determine their orientation and other fracture attributes. Fractures can also be edited, deleted, added manually and visualized in a variety of ways.
- Determine fracture orientation from traces on the point cloud or a draped photo. This is particularly helpful for analyzing rock faces with little relief or when fracture surfaces are obscured in the direction of scanning.
- Plot stereonet of fracture poles with contour plotting, inserting joint sets and calculating joint set statistics.
- Create cross sections, which can be used for a variety of geotechnical applications, including rockfall trajectories down a slope, blasting burden calculations, and fracture surface roughness JRC determination.
- Tools for measuring fracture length, spacing and block size.
- Export point cloud, mesh, fracture, trace and cross section information to CAD, slope stability, and other types of programs.

## Benefits

### Rapid, safe, unbiased analysis.

- Geotechnical surveys using traditional manual methods have many problems, including safety, limited access, human bias, and the speed of manual data acquisition. LIDAR scanning and digital photogrammetry can be conducted at a safe distance from the slope, as high resolution scanners currently have a range up to 1 km. Data from the entire slope can now be measured and quantified at a high sampling density, as compared to the traditional manual methods of taking measurements only where you can safely access.
- Automating the analysis of the data reduces human bias, and both the field scanning and the point cloud processing can be conducted rapidly.
- LIDAR scanners are expensive, but normally the cost of a geotechnical analysis utilizing LIDAR scanning and point cloud processing software will be less expensive than the equivalent analysis using traditional methods. The latest LIDAR scanners are faster, more accurate and less expensive than their older counterparts. Photogrammetry can also be used to produce point clouds, and some photogrammetry software is available at a reasonable cost.

## What is a point cloud?

The output from a LIDAR scanner is a point cloud. It is a dense array of points representing the three dimensional geometry of scanned objects such as highway and mine slopes, underground tunnels and rock and soil foundations. Airborne LIDAR also produces a point cloud that can be analyzed with Split-FX. High-resolution digital images taken alongside LIDAR scans can be used to colorize the point clouds and to produce a three dimensional photodraped image. Point clouds can also be produced from photogrammetry surveys.

## Change Detection

Split-FX has features specifically for change detection. Change detection involves subtracting two point clouds taken of the same scene at different times. The resulting difference point cloud can be used to monitor slope movement, rockfall occurrence along a slope, ground subsidence due to geotechnical problems, underground displacement, etc. It can also be used to calculate before and after volumes for excavations and stockpiles.

## Mission Statement

Split Engineering creates customer value through facilitating optimal and efficient mine operations by custom developing and implementing the most technologically advanced techniques of image analysis. Split Engineering will maintain its reputation in the mining industry for exceeding customer expectations through exemplary customer service.

