



## Enhancing narrow vein interpretation

A Klondex Mines Ltd underground gold-silver mine uses Maptek™ Vulcan™ to optimise various stages of their operation.

The Fire Creek Mine, located in north-central Nevada, is an epithermal vein deposit. Underground bulk sampling began in 2013 and commercial mining commenced in 2014.

Fire Creek uses cut and fill and long hole stoping mining methods. Both methods require narrow mining dimensions to minimise dilution and maximise ore recovery. The behaviour and development of the veins at Fire Creek can be complex, therefore detailed geological modelling is required to optimise success.

In an effort to build a better model of the deposit, geologists review historic core logs and photos. As with many projects, geologists' interpretations of drill core vary and logging data is often inconsistent through different generations.

Fire Creek is no exception. The geology team has spent significant time sifting through historic core photos and re-analysing core logs. To facilitate this work, the geology team needed a way to incorporate diamond drill core photos that illustrate lithology, alteration and the various styles of mineralisation alongside the geological data within Maptek™ Vulcan™.

Using Vulcan fundamentals learned on the job, brainstorming sessions during a Maptek site visit, and skills acquired during a lava scripting course, the geology team was able to turn this concept into reality.

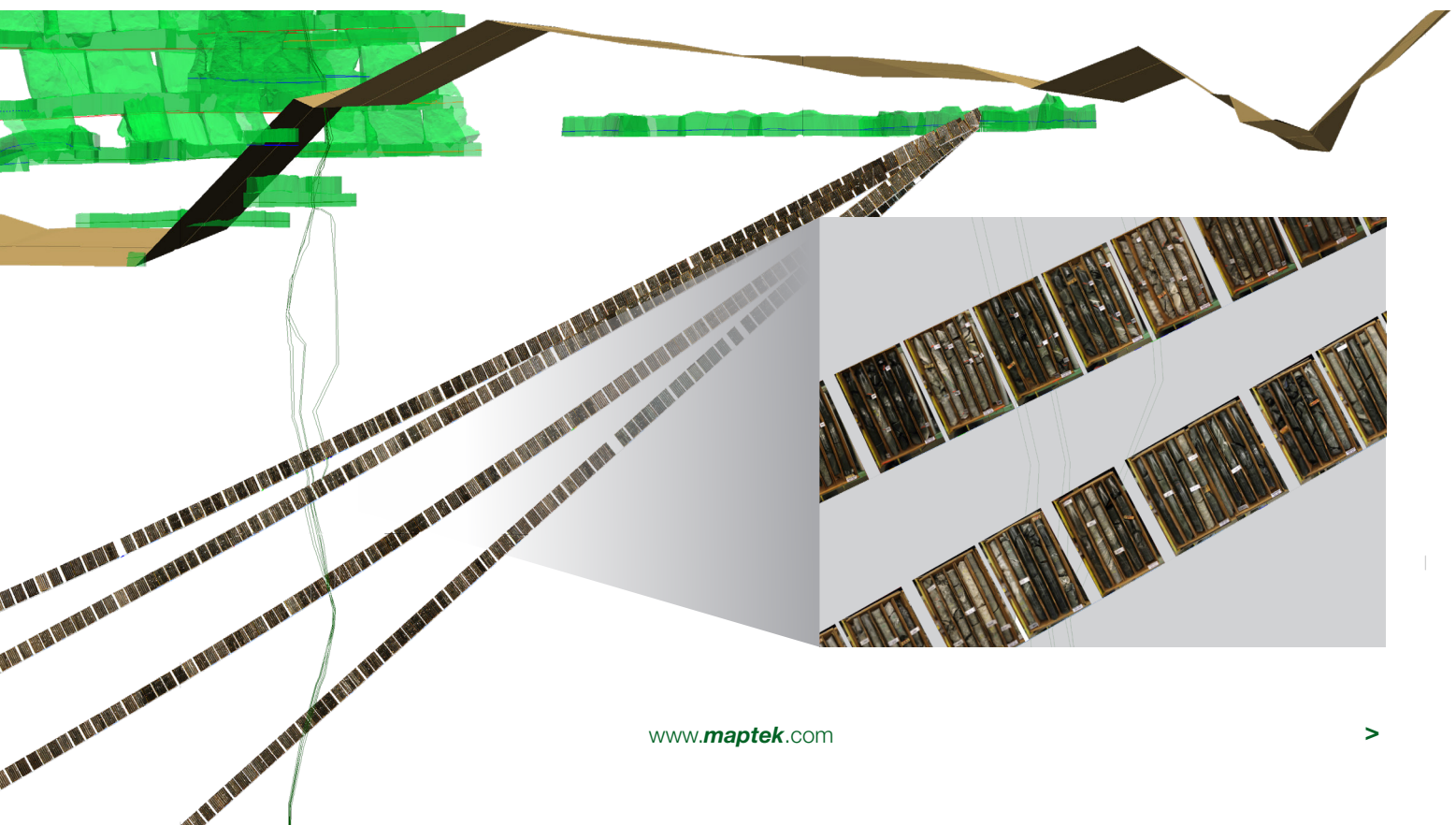
### Lava scripting

A custom lava script was built off existing Vulcan functionality to enable users to display images of core boxes directly down the drill trace. At the macro scale, geologists are able to view the

differences in lithology, rock conditions, and alteration throughout multiple holes on drill fans and in three dimensions.

'It takes time up front to set up the naming convention and then roll out the new process to make sure the photos are actually usable. But once the leg work is done, being able to spin the drillholes around with the photos loaded adds a whole new dimension to how we use our data,' commented Mine Geologist Eric Hobbs.

The output allows the team to quickly review, correct, and test broader interpretations, providing a better understanding of the ore system, which results in improved models.



With computing enhancements delivered in Vulcan 10 and higher, the team is able to review the image registrations, assay data and other geological information.

Geologists can zoom out to view broader alteration and lithology differences between holes, or zoom in to the full resolution of the photo to look at individual vein textures and characteristics.

### Workflow

'When I am flagging a new drillhole, I load the vein and lithology triangulations alongside the core photos. I can see exactly what the intercepts look like in relation to the surrounding drillholes and data,' said Hobbs.

'I can quickly view the core photos for multiple drillholes from the same drill fan and see how the vein behaves along strike, changes in elevation, lithology and so on.'

'I can then make a confident judgement on how to flag that intercept and adjust our lithology triangulations on the fly,' he concluded.

### Outcomes

The biggest benefit to the mine site is an increased confidence and understanding of the deposit. They are able to build and update geological models significantly faster than previously.

This leads to more consistent logging data, allowing for faster target recognition for surface and underground drilling programs, and ultimately results in better ore/waste calls from the ore control geologists.

Through 'out of the box thinking' and lava scripting training, Klondex geologists have created a step change in the level of understanding of the Fire Creek deposit.

*Thanks to  
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