

COPPER MINE SURVEY

| GIS | EXTRACTION | INDUSTRY |

THE CLIENT

FREEPORT-MCMORAN



Freeport-McMoRan, Inc. is an American mining company who is one of the world's largest producers of copper and gold. Founded in 1912, Freeport had 2013 revenues of \$18.982 billion.

Associated UAV packages:

- ✓ Big Mapper
- ✓ Big Mapper XL
- ✓ Crop Mapper
- ✓ Crop Mapper XL
- ✓ Ultimate

THE NEED

MINE SURVEYING

Freeport-McMoRan operates the copper mine at Tenke Fungurume (TFM) in the Katanga Province of the Democratic Republic of Congo. TFM's mining activities include surface mining, leaching, and SX/EW operations. They need weekly topographical surveys in order to calculate the production capacity and create digital surface models (DSM) of the mine. Today, these observations are made by surveyors on foot and requires the mining operations to cease, presents a danger to the surveyors, and does not achieve the most accurate measurements. Additionally, at an average size of 400ha, harvesting the data from these mines is often time consuming and tedious.



To address TFM's needs, Delair-Tech used their Big Mapper drone package to create 2D and 3D maps of the mine. Then, Delair-Tech used the capacities of its Data Center to extract the most useful pieces of information: cubature (volume) calculations, DSM, and high-resolution maps. Since Delair-Tech's drone + data solutions are turn-key, they allow companies like Freeport-McMoRan to easily invest, deploy, and start seeing quick results in the form of deliverables from these next-generation aerial observation platforms.

THE SOLUTION



OPEN-PIT COPPER MINE SURVEY FOR FREEPORT-MCMORAN

THE OPERATION

TFM employed Delair-Tech's drone + data solution to survey several open pit mines of 400ha each in the Democratic Republic of Congo. 4 open pit copper mines were flown once per day, for two days, in partnership with local drone operator, Kipungu.



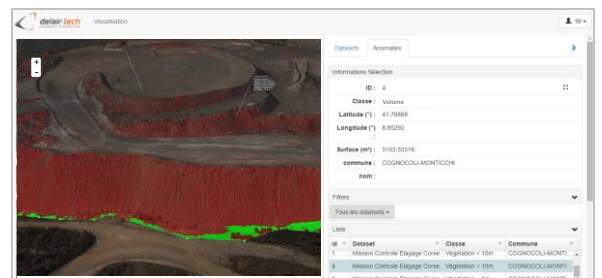
DATA ANALYSIS

Putting the data to work. Thousands of images were captured by the DT-18 during the flights in DRC. The images were analyzed by Delair-Tech's Data Center which uses proprietary algorithms developed specifically for the needs of large, industrial end-users:

- Volume calculations
- Creation of contour lines
- Pre and post-mining imagery of land disturbance
- Creation of 2D orthophotos and 3D models of the mines, compatible with AutoCAD-based software MineSight (.shp or .dxf) at 4.5cm GSD with a Z precision of 9cm

DELIVERABLES

- » A report that indicates the mine volumes, changes over time, and contains contour line maps
- » A web visualization tool for viewing and archiving past results
- » Integrating the data into Freeport-McMoRan's own mining software (AutoCAD, MineSight, etc.)



CONCLUSION

- ✓ DT-18's superior range allows completion of multiple objectives in just one single flight
- ✓ Accuracy is comparable to traditional, ground-based methods
- ✓ Measurement results are achieved much faster
- ✓ 2D photos and 3D models improves mine site visualization
- ✓ TFM increased mine site safety by leveraging UAV technology

