

Quidich: Mining Case Study

Account Background

In December of 2015 we mapped a 356 acre mine in Uttar Pradesh for the MP Mining Board. The client wanted to see how our UAV's could provide them with better information on their mine, specifically calculating the fill volume of an open pit mine and also tracking the activities on the perimeters of their land. They wanted to see if several reported cases of illegal mining were true, and exactly how much was stolen. We happened to be in Delhi when the contract was finalized, so a few hours by road our team and equipment was on site and ready to work. We first explored satellite imagery of the area to provide us with a feel for the terrain.

Solution Deviced

With this knowledge we planned a flightpath over the mine. The sky was clear, there were almost no clouds, but the wind was a little strong. The conditions were almost perfect to fly. Using a DJI Inspire 1 UAV equipped with a RGB (true color) sensor we flew the flight path. In our computer software we set a GSD (Pixel size) of 4.4. The software set the flight altitude to 63 meters. Due to the size of the area and the battery limitations of this UAV we needed three flights to cover the area. Once the flight path was set we were ready to fly. The UAV followed the flight path until it was low on battery, we would land, and change the battery, then take off again letting the UAV begin its image collecting right where it left off. In total the sensor took 1245 images.

Results

Team: 2 people

Flight time: 10 min

Flight Altitude: 120m

Number of pictures: 50

Number of GCP's: 3

GSD (Pixel Resolution) – 5cm

Total worktime: 1 day

Drone: Customized multicopter with multispectral camera

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Summary

Once we finished flying, we uploaded the images to photogrammetry software on our laptop, and began processing. Each photo is georeferenced, which means the precise geographical coordinate is recorded in the photo's metadata. These images are stitched together to produce a high resolution orthomosaic, or photo of the entire area we flew over. This photo can enable the client to see where illegal extraction on their property is happening, and better plan logistics to stop this. The client can see the exact placement of roads and buildings, to better manage their mine operations. This image is then used to produce a Digital Elevation Model of the area. This model is a 2D topographical data layer whose pixels record the exact elevation at that point in the real world. This model can be used to plan projects, build a contour map for mine surveying, and give the client a better understanding of their space. In addition we provided the client with a 3D model of their entire mine, this model can be used to calculate the volume of both open pit's and stockpiles. We used our model to determine the fill volume of one pit in particular. This type of accurate data collection and calculations were shocking to the client, they had never thought this type of calculations were possible before. With our UAV's and photogrammetry, truly impactful results can be achieved.