

Success Stories

Enhancing Mine Planning and Management

Client: Odisha Mining Corporation

<http://www.orissamining.com/web/>

Sector: Mining

“Skylark Drones had the technical insight to understand our needs while also being rooted and object oriented enough to come up with sustainable solutions”:

Manmohan Nayak, Manager, Mining, Odisha Mining Corporation

Executive Summary

The Odisha Mining Corporation in association with Skylark Drones conducted a project to digitize and analyse an area of 250 acres to save time and enhance insights in the mine planning and management process. The key takeaways are as follows

1. On field planning exercise time reduced by 30X times.
2. Costs for producing actionable outputs decreased by 15%
3. Number of useable data points increase by 80 times

Challenges

The traditional method was typically executed as per the following details

Table 1: Traditional Mine Survey using Total Station

On field Execution time	600 hours
Cumulative Weight of equipment	6.5 Kg
Manpower	5
Deployment time	30-45 minutes

The current method of collecting data for topographical information involved disrupting mine operations for days on end, thereby decreasing productivity and increasing time and cost overruns.

Furthermore the data collected was often found to be incomplete as several areas of the mine were inaccessible by humans.

The information and maps produced were therefore unreliable and offered a basic overview of the mine that did not reflect ground reality or provide information about how topography affects material movement or stockpile distribution.

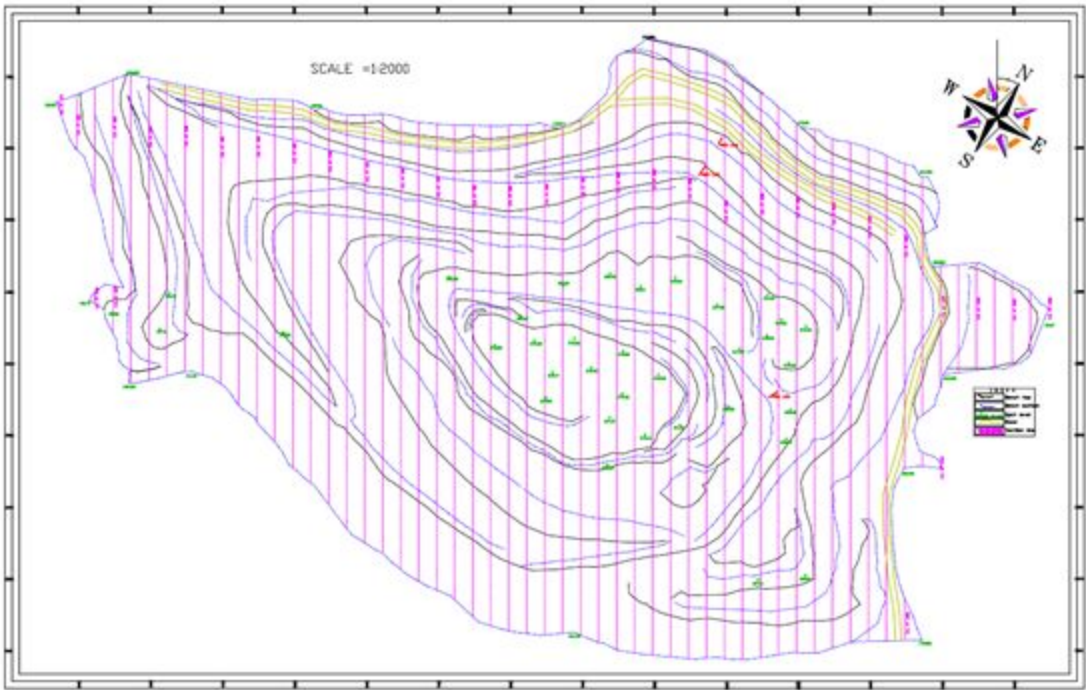


Figure 1: Traditional Methods Output: Contour Diagram

How Skylark Drones Helped

Skylark Drones completed the survey as per the following details

Table 2: Drone based survey

On field Execution time	2 Hours
Cumulative Weight of equipment	3.5 Kg
Manpower	2
Deployment time	0.25-0.50 Hours

UAV based GIS mapping offered the following advantages aside from the reduction in on-field time from 15 days to 2 hours.

1. The day to day operations of the mine were not disturbed or hindered in any manner
2. The outputs provided by Skylark helped in the planning of additional operational enhancements such as
 - a. Material movement optimization through Haul Road Map
 - b. Planning with stockpile maps
 - c. Identification of water logging areas
 - d. Slope Map to detect unstable and steep cut walls
 - e. Growth tracking



Figure 2: Haul Road Map

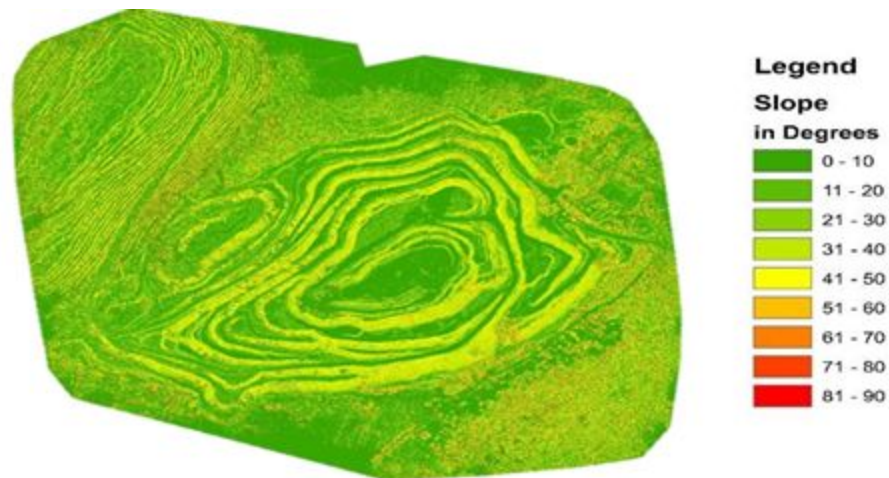


Figure 3: Slope Map

Results, Return on Investment and Future Plans

Aside from the planning, management and, stakeholder accountability advantages, Skylark solutions also offered tangible financial returns as per our quick estimates on ROI using Skylark Solutions

Table 3: ROI on Drone based Mine Survey

Overview	Traditional methods	Skylark Operator	ROI
Time Per Survey for data collection	600 hours	2 Hours	300X
Time Per Survey for data analysis	250 hours	4 Hours	62.5X
Man Hour Cost	200 per hour	NIL	
Equipment Cost	200 INR/hour	NIL	
Frequency	4 times a year	Once a month	3X
Annual Cost Savings			15%

Future Plans: Representatives from The Odisha Mining Corporation were extremely positive about the continual application of drone solutions. Possible collaborations include implementing

the mapping and modelling capabilities to digitize records and to help in planning and understanding the effect of mining practices.

Providing better management and planning insights for canal irrigation

Client: E.I Technologies Pvt. Ltd.

www.eitech.in

Sector: Infrastructure

“Drone systems helped to streamline our decision making and drastically reduced the need for site visits for assessments”

Sandeep Nadigar, Founder, E.I Technologies

Executive Summary

E.I technologies were entrusted with the topographical surveying of The West and East Bank Canals of the Malprabha irrigation project as part of the modernization effort undertaken by the Karnataka Neeravari Nigam Ltd. E.I Tech partnered with Skylark Drones to bring in innovation and increased authenticity for this challenging prospect. The key takeaways are as follows

1. The survey reduced the time for cross validation of elevation data by 34%
2. Time required to conduct inspection of canal decreased by 33X per km.

Challenges

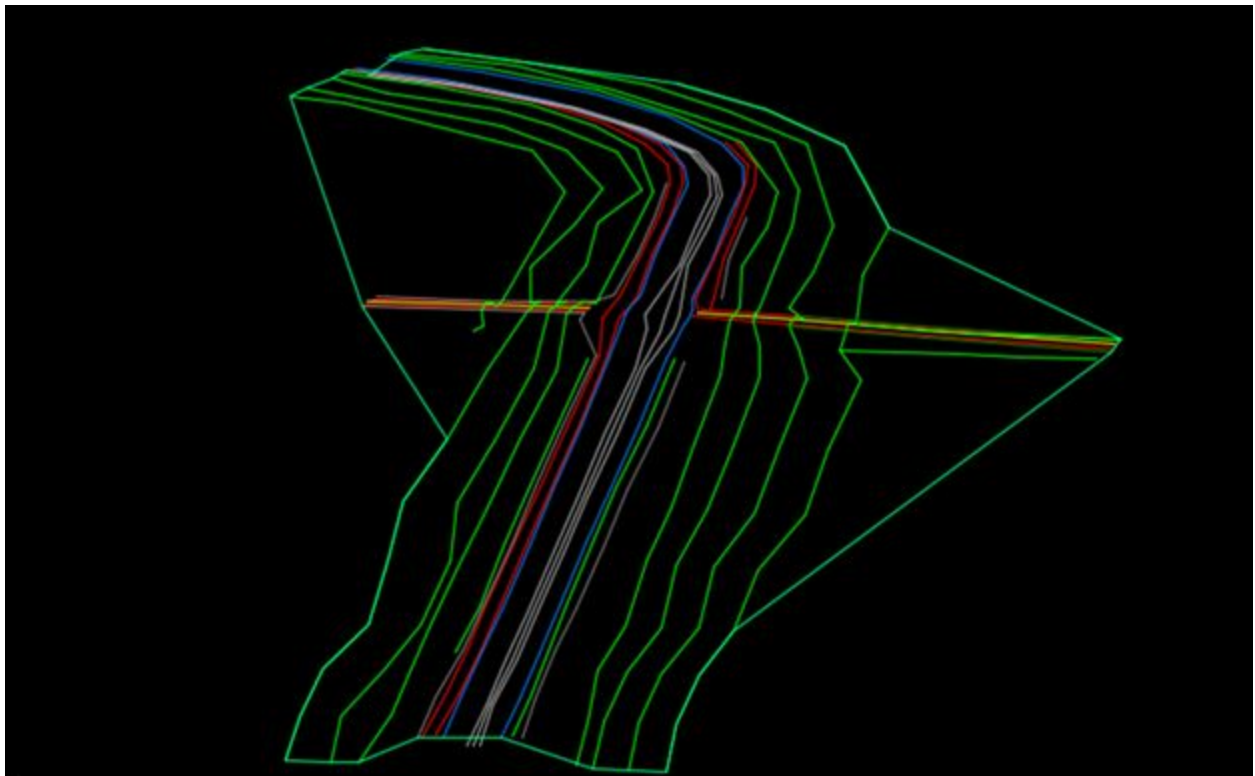
The traditional method was typically executed as per the following details

Table 4: Traditional Canal Mapping and Management

On field Execution time per km of survey	13.33 hours
Cumulative Weight of equipment	6.5 Kg
Manpower	2
Equipment deployment time	10 minutes

The primary objective of the ERM (Extension, Renovation and Modernization) of the canals in Karnataka was undertaken to increase the velocity of waterflow from the Renukasagar Reservoir at Naviluteerth, Karnataka to the end users who are primarily farmers. In order to do this they needed insights that delivered accurate information about the elevation along the centerline of the 150km long section, as well as the nature of impediments present along the course of the canal such as excessive silt accumulation and canal structure damage.

Figure 4: Current method output for Canal Mapping



How Skylark Drones Helped

Skylark Drones completed the survey as per the following detail

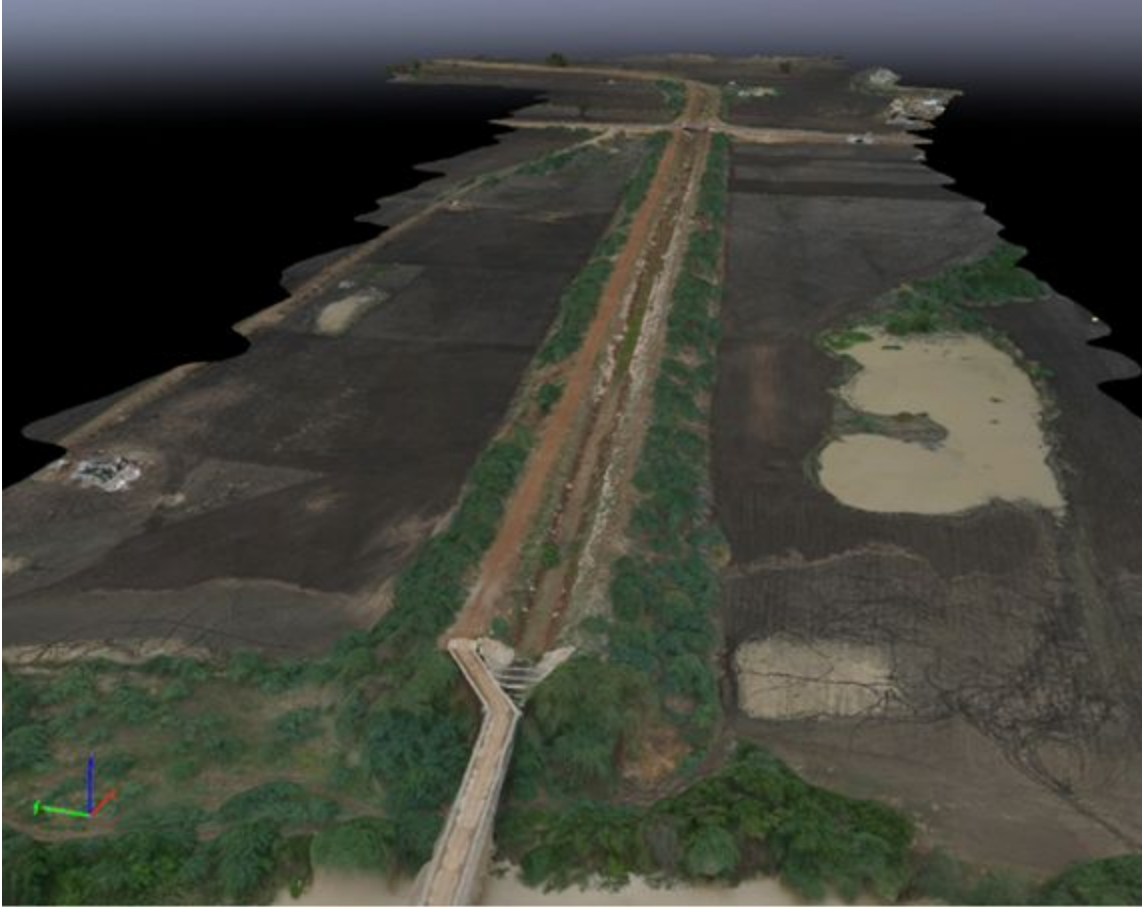
Table 5: Drone based survey and inspection

On field Execution time per km of survey	24 mins
Cumulative Weight of equipment	3.5 Kg
Manpower	2
Equipment deployment time	15-30 minutes

UAV based GIS mapping offered the following advantages aside from the reduction in on field time from 45 minutes to about 4 minutes

1. The three dimensional models and flythrough video offered project managers to identify the cause and draft solutions for problem areas without requiring on field visits.
2. Aside from the qualitative advantages such as the visualization, the outputs also offered actionable data such as the geo-location, dimensions and surroundings of features.
3. The elevation data by Skylark was provided for every 30m grid intervals allowed for a more accurate method to estimate the general slope of the canal.
4. This gave engineers means to identify areas where water flow velocity has decreased or deviated from estimated values.
5. The regions of significant deviation were then correlated with true image outputs such as the orthomosaic to identify possible physical causes.

Figure 5: Drone based visualization of the same stretch as in Figure 4



Results, Return on Investment and Future Plans

Skylark Drones offered the flexibility and scalability advantages that proved to make sound financial sense in terms of reduced time and labor spent collecting data.

Significant cost savings were made by being able to provide near real time the status of the physical structures of the canal.

This proved to be a useful risk identification and mitigation tool for the short term and medium term maintenance of the canal.

Table 6: ROI on drone based mapping and inspection

Overview	Traditional methods	Skylark Operator	ROI
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Time Per Survey for data collection	2000 hours	60 Hours	333X
Time Per Survey for data analysis	800 hours	180 Hours	4X
Man Hour Cost	250 INR per hour	NIL	
Equipment Cost	250 INR/hour	NIL	
Frequency	Once	Once	
Annual Cost Savings			4%

Future Plans: The drone data will soon be employed to become the single source of truth that the engineers and planners will rely on rather than using it as a verification method.

3. Optimizing Smart Meter Reading

Client: ZenMeter

www.zenmeter.in

Sector: Utilities

“The consequence of this technology, fully implemented, could eradicate slow throughput in terms of data collection, fasten the process of payments and reduce dependency of missing out on data sets due to the residences being inaccessible.”:

Satheesh Kumar, Founder, Enzen Global Solutions

Executive Summary

ZenMeters Pvt. Ltd. wanted to implement a cost effective method of data collection that would cut down on time spent during data collection. In this regard ZenMeters partnered with Skylark Drones to utilize the superior perspective drones provide. The key takeaways from the collaboration are as follows

1. Data collection rate increased by 4 times.
2. Completeness of data set increased by 13.45%

Challenges

The traditional method was typically executed as per the following details

On field Execution time per meter reading	5 mins
Cumulative Weight of equipment	0.5 Kg
Manpower	2

The primary objective of the exercise was to further optimize smart meter reading practices by cutting down on the time required to collect meter readings.

Current methods involve an employee to collect meter readings by foot. However this leads to a number of disadvantages such as incomplete data sets where the households are inaccessible. The time required to complete the data collection over a large grouping of household is also compounded by the average relative distance between two houses and number of houses in each grouping.

How Skylark Drones Helped

Skylark Drones completed the data collection exercise as per the following details

On field Execution time per meter reading	2-3 seconds
Cumulative Weight of equipment	2.5 Kg
Manpower	2

Skylark Drones developed a drone solution to automate data collection by incorporating the Data Collection Unit (DCU) used by ZenMeter into existing drone systems.

The tangible gains included

1. An average decrease from 5 minutes to 3 seconds per meter reading

2. Coherent data set that was not constrained by the inaccessibility of households
3. Increased operational flexibility as the UAV system could be deployed during suitable daytime or nighttime hours to avoid disturbances.

Results, Return on Investment and Future Plans

Skylark Drones solutions proved to be a convenient method to extend the reach of data collection practices. As the drone systems were used to overcome obstacles on the ground the meter reading was smooth and seamless that did not require significant human training or skill development.

Tables showcasing ROI computation

The future development will be to automate the data collection such that the drones can be deployed on a monthly or weekly basis. This would greatly decrease the dependency on the availability of human labor.