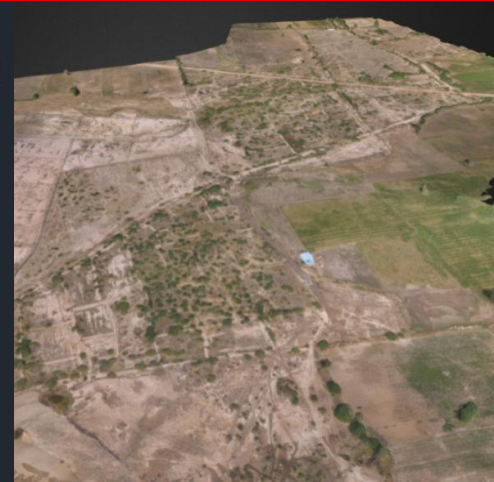


# HUVI<sup>+</sup> iR

## Aerial Topography Survey of Solar PV Site



# Aerial Topography Survey of Solar PV Site

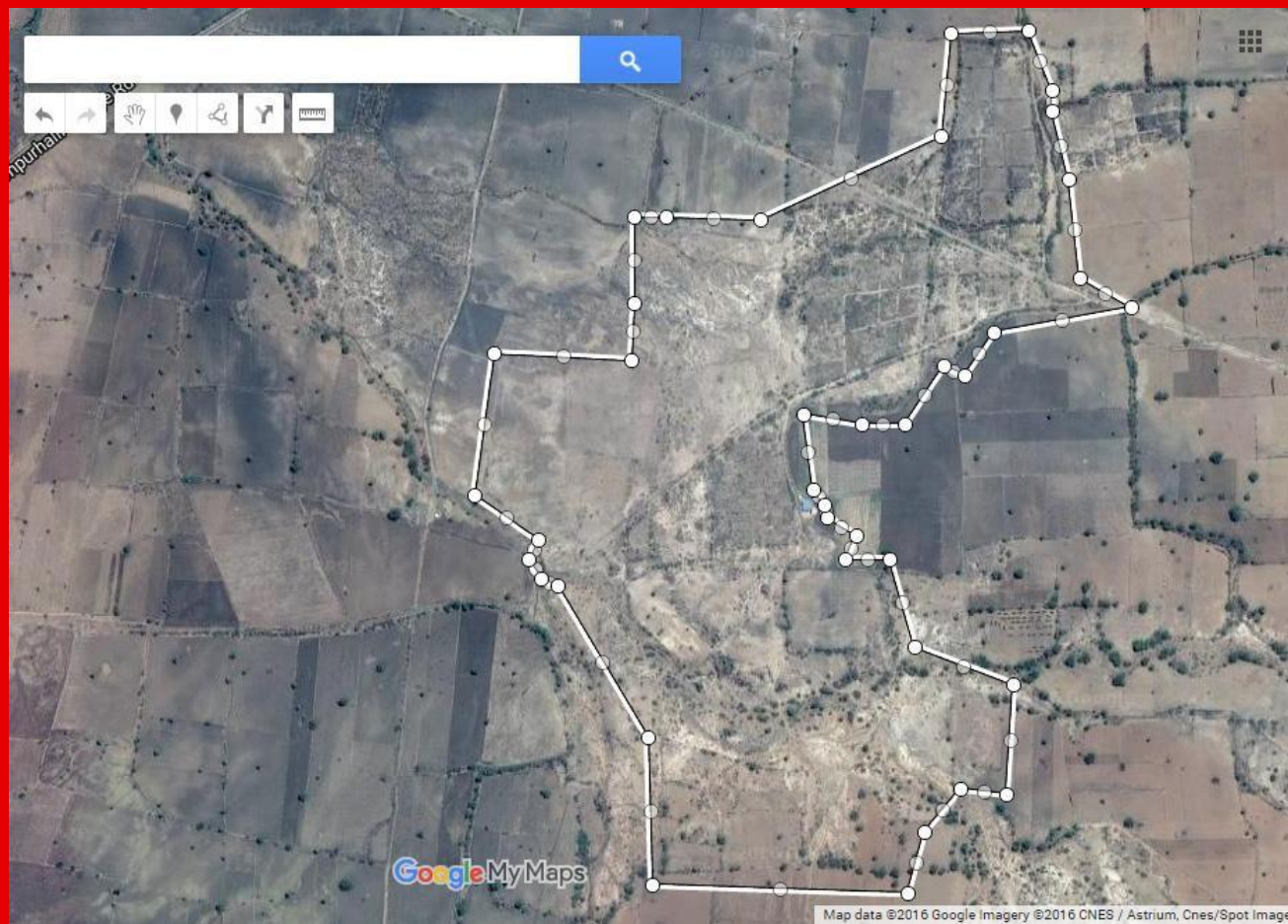
HUVIAiR was asked to conduct an aerial survey of a 100 acre site on which a 20 MW solar PV plant was being planned. The site is located in Yadgir district of Karnataka. The outputs needed were:

- 2D top view image (Orthomosaic) with boundary demarcated
- Contours
- 3D model

# Survey Process

## Before going to site:

- The client assisted us in identifying approximate boundary points of the site with the help of satellite imagery of Google Earth.
- Approximate flight path and image overlap intervals will be determined by HUVIAIR based on this input.



Approximate boundary extents sent by client using Google Maps/Google Earth Polygon marking feature





Drone Flight Plan was designed using the boundary polygon  
Altitude of flight – 120 meters above ground level; Image Overlap – 70%

# Survey Process

## At Site:

- Visible markers were placed at the boundary milestones.
- After refining the flight path and image overlap interval settings at site, the UAV was flown across the site and several hundreds of geo referenced images were captured.
- The team of two from HUVIAiR spent 7 hours at site.



Visible markings were placed at boundary vertices that were pre identified by the customer

# Survey Outputs

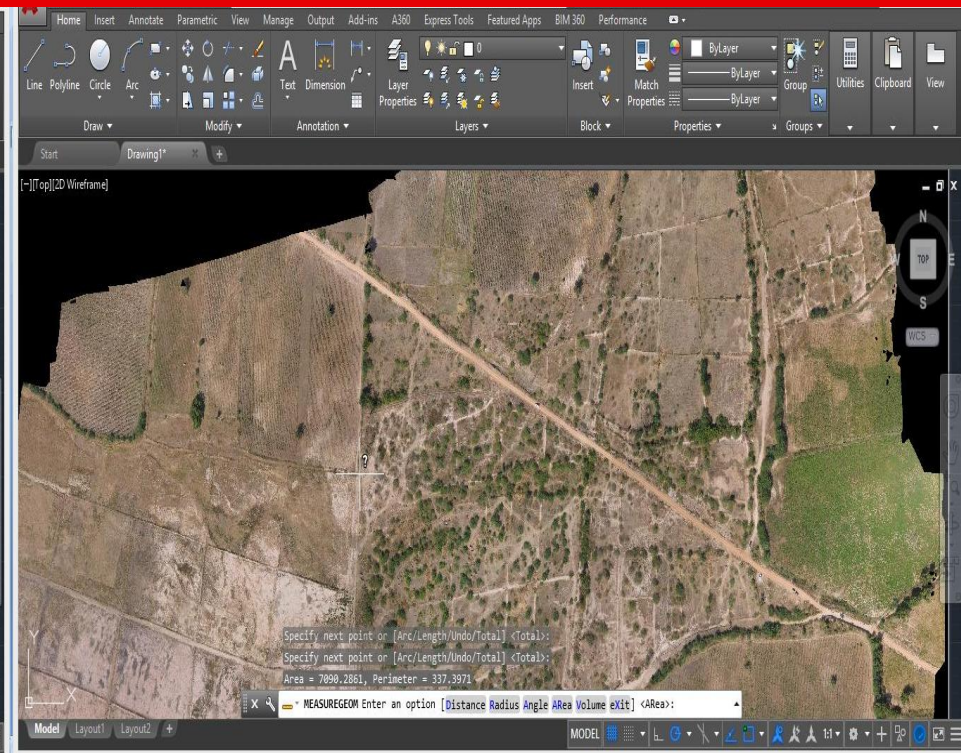
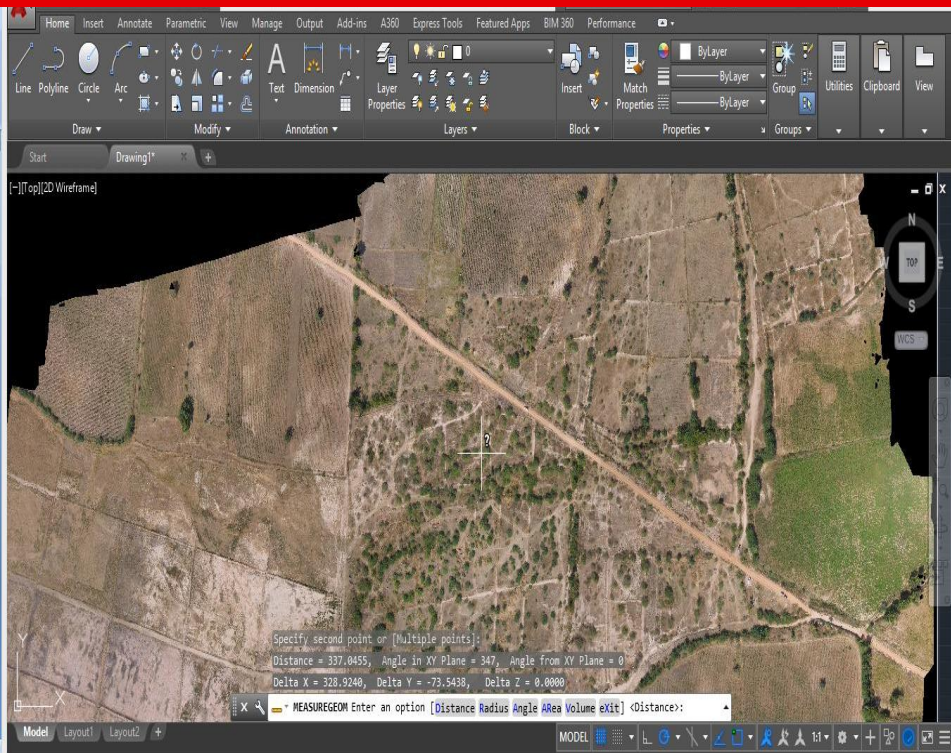


# 2D top view image (Orthomosaic) with boundary demarcated

- Various images of the site are stitched together to form one single 2D top view scaled image of the site. The image resolution is up to 5 cm/pixel.
- The boundary was identified using the visual markers that were visible on the final image.
- This image is created in the projection system of the customer's choice. It can be opened as a geotiff file with CAD and GIS tools for further 2D analysis and feature digitization.
- In this case, the customer used this image as the base layer for planning the layout of the panels and other components to be installed.
- This image can also be opened on Google Earth (it will overlay on top of the satellite imagery).
- Highly accurate (up to 3 cm accuracy) distance and area measurements can be performed on all the above mentioned tools.



2D top view image with boundary demarcated



Examples of measurements done on Autocad (in EPSG3857 projection)

# Contours

- The images were converted into a dense 3D point cloud of the surface, with each point having a unique x,y,z coordinate.
- The 3D points were converted into a contour map.
- Contour map of the surface were generated with the required intervals. This can be opened as a .dwg/.dxf on CAD and GIS applications for further analysis.

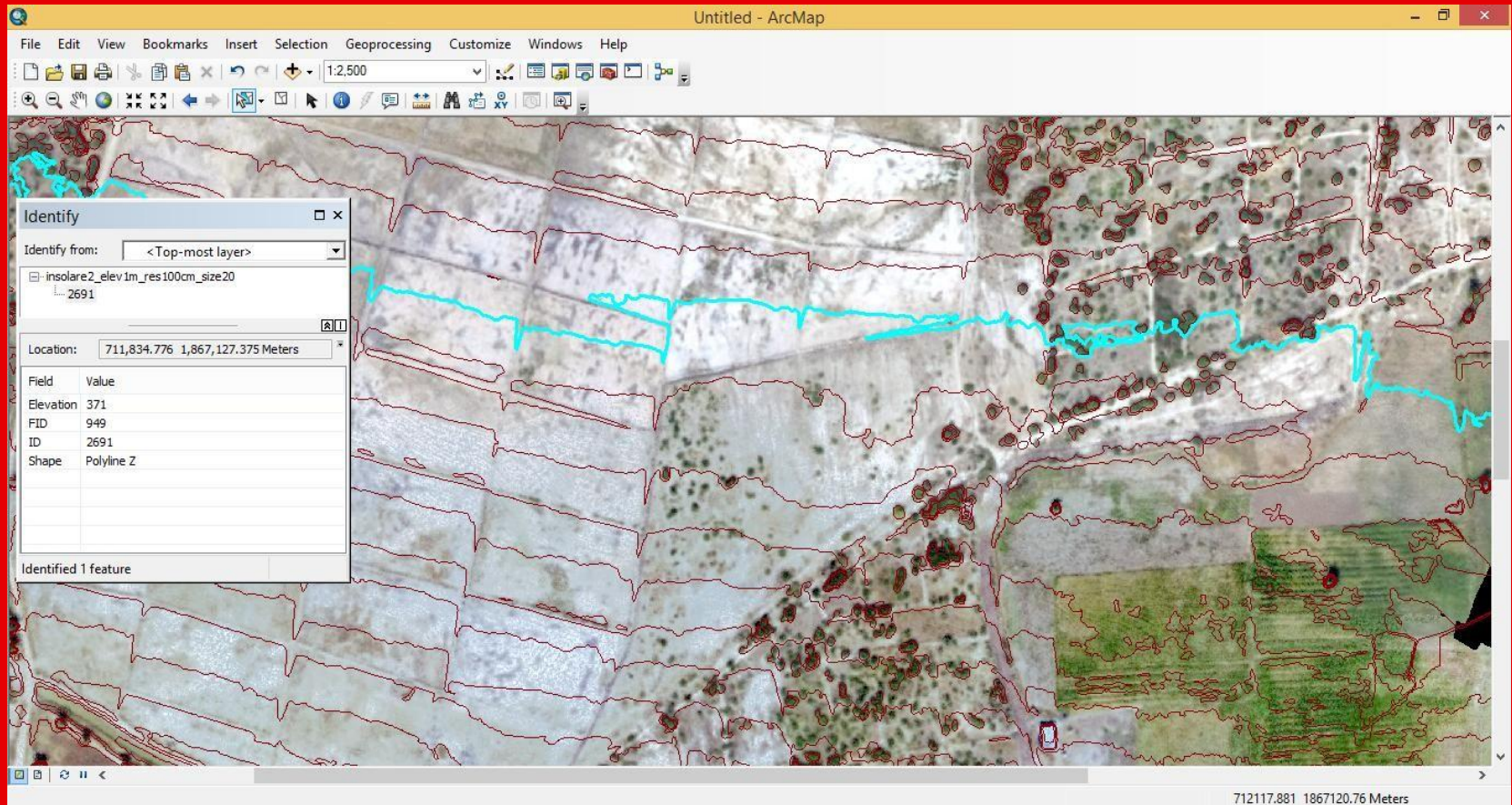


CONTOURS



1 meter interval contour map





Contours accurately overlaid on the image viewed in GIS software

# 3D Model

- A 3D model of the site was generated. This model was used by the client to fly/orbit through the site to visualize the details in 3D and plan the work at hand.



# Summary

- The project was completed in 4 days – 1 day of pre site visit work + 1 day survey at site + 2 days for processing and delivering outputs.
- Traditional contour + boundary surveying would take at least 10 days time to complete.
- The high resolution 2D top view image (orthomosaic) and 3D model are additional outputs that traditional surveying cannot generate. These outputs add tremendous value to the site development planning process.
- Accuracy of elevations, distances, areas and volume measurements are within 2-4 cm.
- Despite these additional outputs, the cost of aerial surveying is comparable to the cost of traditional surveying.

# About Us

HUVIAiR Technologies is a drone data based solutions company.

We expertise in providing solutions for the survey, construction, infrastructure, renewable energy and natural resource management sectors. We have a deep understanding of UAVs, sensors, photogrammetry, GIS mapping, surveying techniques, image processing, data analytics and software programming.

Our services include consulting, training, and drone data visualization and management services to individuals, corporates, governments and not-for-profits working on projects in these sectors.