# ASSIGNMENT 3

# GEODATA ACQUISTION

# UAV FOOTBALL FIELD MAPPING



*Photo Courtesy: https://www.outsource2india.com/eso/construction/drone-survey-services.asp*

## MUHAMMAD BILAL
## Matriculation ID: 12214473

## Introduction

In this report I have measured the width and height of the goal post of the football field. For this purpose, images of football field taken by UAV drone processed in Agisoft software. DEM and Orthomosaic Images created by using drone images that are useful for my objectives to measure height and width of goal posts. Below is the series of steps that I have taken for this analysis.

### Step 1 (Aligning Photos)

After importing images into the Agisoft software, the first step I took was aligning photos because it is necessary to determine the camera positions and orientations during image capture. It involves analyzing overlapping photos and matching common features to establish their relative positions and enables accurate 3D reconstruction of scene.



### Step 2 (Georeferencing)

After importing GCP (Ground Control Points) with Specific area Coordinates, I georeferenced UAV images using GCP. It helps in accurate alignment of image data with respect to real world coordinates and improves overall accuracy. After clicking on optimize camera calibration the accuracy I got is 1 cm.

### Step 3 (Point Cloud vs Mesh)

After aligning images with real world coordinates then I generated point clouds from the images that created a 3D detail representation from aligned photos. **Point Cloud** offers high accuracy and details making it suitable for precise measurements and analysis. On other hand **Mesh provide** smooth surface that is only for visualization surface. I chose point cloud because to need to do precise measurement of goal post length and its height.
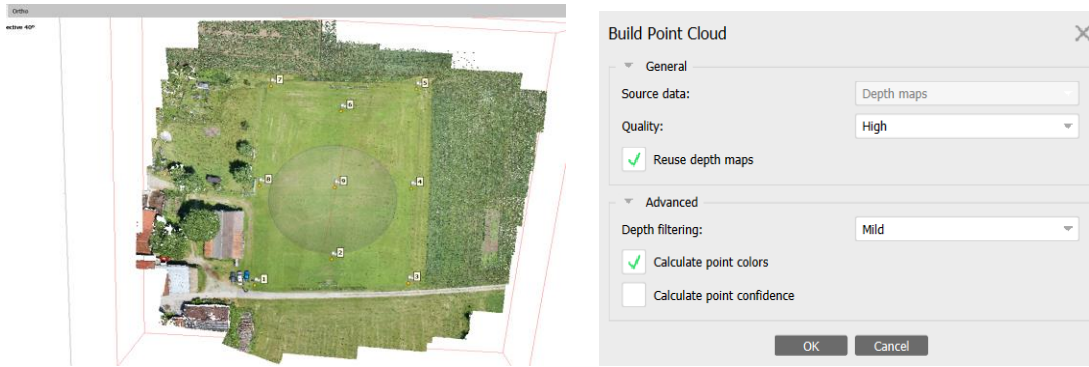
## Step 4 (DEM Creation)

For determining the height of goal post, I computed digital elevation model from point cloud data that generate accurate and continuous representations of the football field. Using Measure Scale for that.
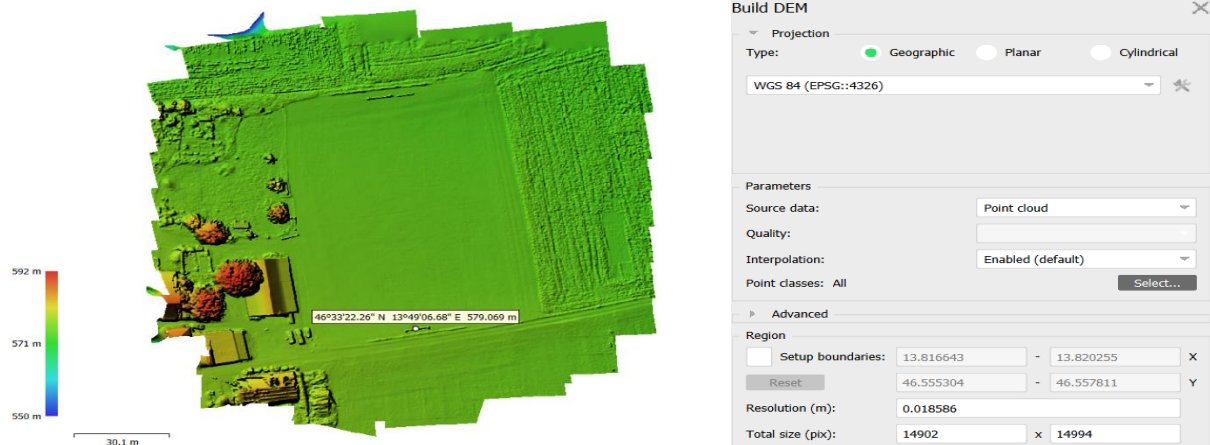


## Step 5 (Orthomosaic Imagery)

For measuring the width of the goal post, I generated Orthomosaic imagery from point cloud data that is geometrically corrected, consistent scale and orthorectified image to create accurate georeferenced representation of football field. Using Measure Scale for calculation.
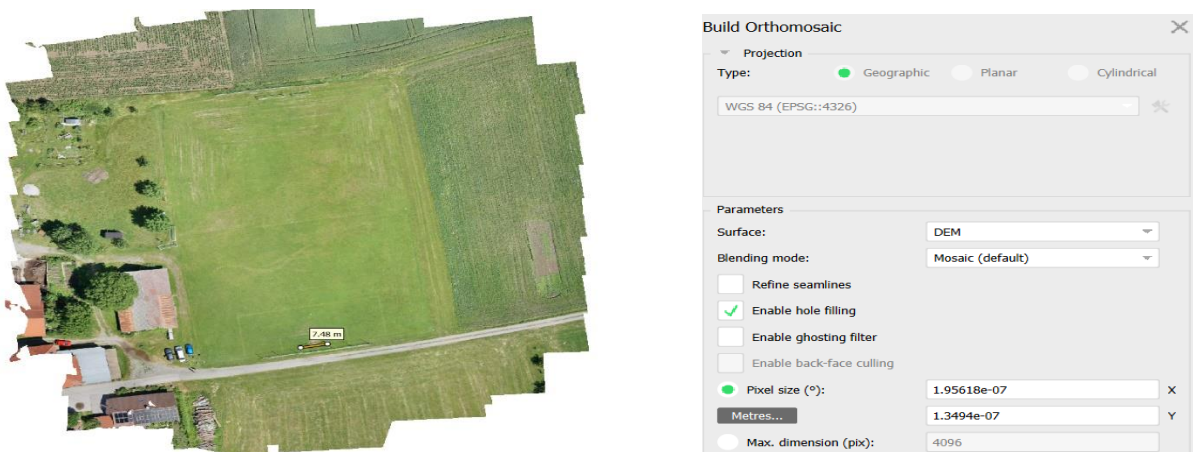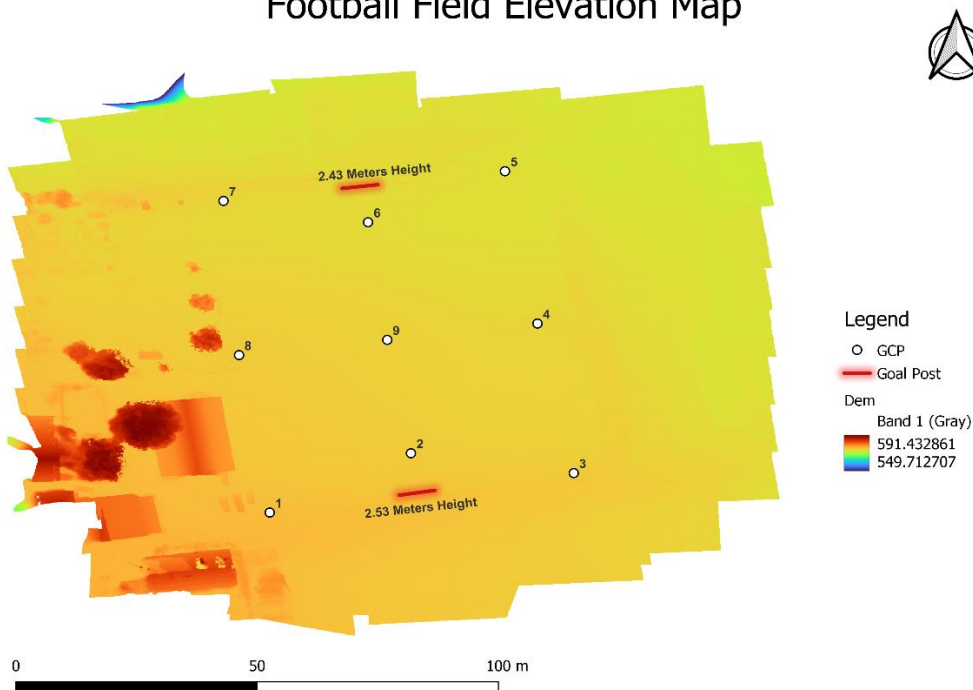
## Result

1: - About the width of both goal posts, the analysis does not show any major difference in them.



2: - About the height of both goal posts, there is a slight difference recorded about 1 meter.

## Point cloud or Mesh

**Point Cloud** offers high  accuracy and details making it suitable for precise measurements and analysis. On other hand **Mesh provides** smooth surface that is only for visualization surface. I chose point cloud because to need to do precise measurement of goal post length and its height.

## Quality Estimation

I conducted a visual inspection of point cloud and dem although they are high quality but still there is need of improvement in point cloud estimation because there some patches for that we need more images from different angles and GCP. Although it serves the purpose of measuring Width and Height of both goal posts.

## Pros and Cons of Quality of Data

**Pro:**  Perfectly Aligned GCPs marks that almost covered the whole football field allow accuracy to increase.
**Cons:** Flight plans should be organized more to capture more information for an improved representation of the scene. Many goal posts confuse me in this analysis.