

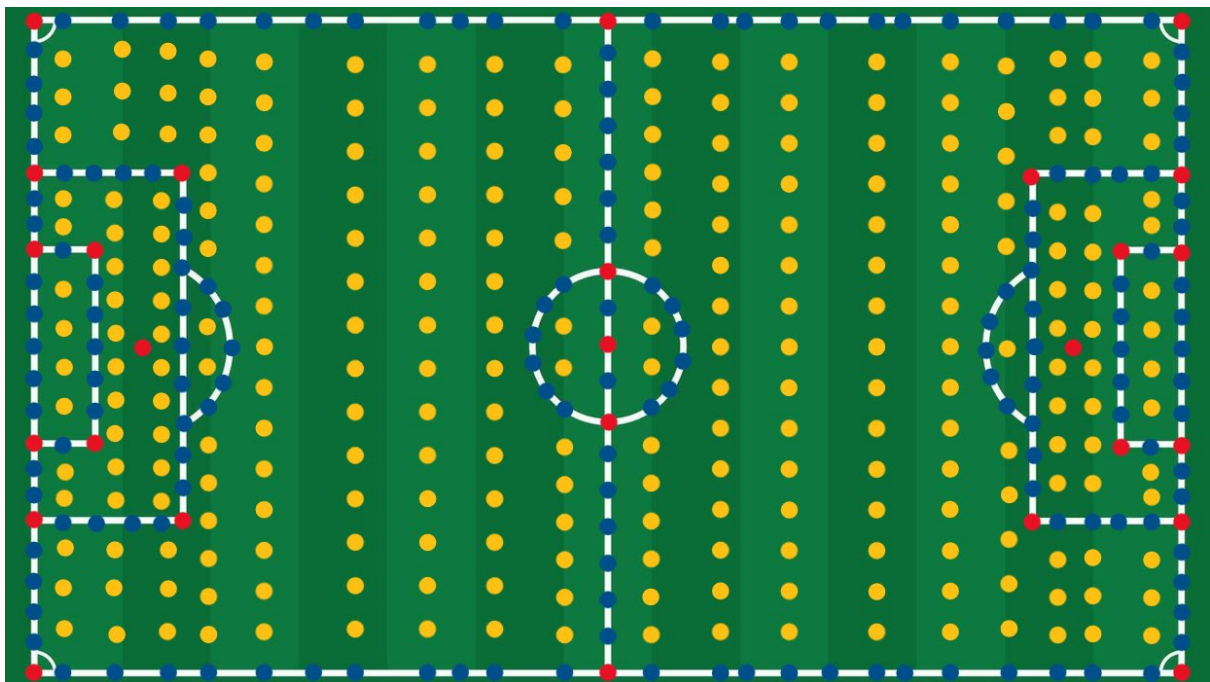
Instructions for Collecting Information About a Football Field for Using VOL Technology

The dimensions of a football field are not standardized and vary from stadium to stadium, and in some cases, from match to match. For the VOL system to operate accurately, a 3D model of the field's surface must be created. The field itself is uneven and may have irregularities (hills and depressions). Any irregularity significantly affects the accuracy of the VOL system. To reduce the likelihood of errors and improve accuracy, precise and multiple measurements of point coordinates on the field surface must be taken.

The more points are measured evenly across the field surface, the more accurately the surface modeling will be performed, and the more precisely the VOL system will operate.

Below, we have prepared a diagram of the football field and our recommendations.

Field Diagram



Red Points

Mandatory for the system to operate:

- Center of the field
- Intersection points of the center circle and the halfway line
- Intersections of the halfway line and the touchlines
- Corners of the field
- Corners of the penalty areas

- Corners of the goal areas
- Penalty spots (11-meter marks)
- Intersection points of the penalty area lines with the goal lines
- Intersection points of the goal area lines with the goal lines

Blue Points

Provide the level of accuracy. Recommended spacing: 2 meters. The minimum number of points is shown on the diagram. The smaller the spacing, the more accurate the measurements.

These points are located on all the marked lines. Measurements must be taken exactly in the middle of the line.

Yellow Points

Provide information about the field surface in "unmarked" areas. Used to achieve an acceptable level of accuracy for offside lines in the middle of the field. Recommended grid spacing: 2 meters. Maximum acceptable spacing: 5 meters.

Total number of points: from 300 or more depending on the grid spacing.

It is important that all lines on which the yellow points are placed lie on a straight line across the field (Y-axis).

Additional Recommendations

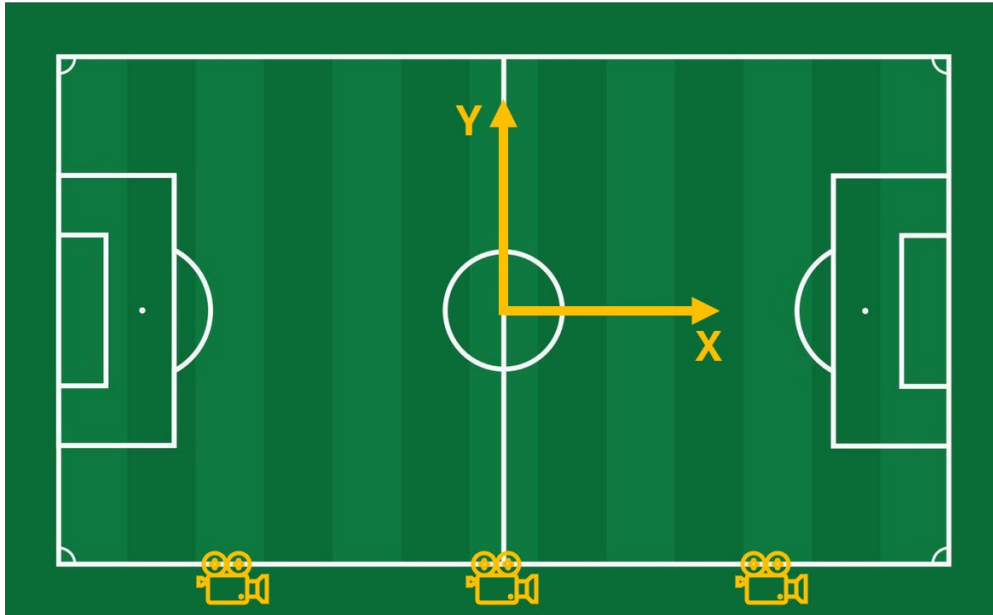
If the measurement team's resources are limited and it is impossible to collect all the required blue and yellow points, then as many points as possible should be measured, distributed as evenly as possible across the field.

Minimum distance between points: 1 meter. If multiple points are placed closer than this, the higher-priority point should be used. Point priority order: Red (highest priority) → Blue → Yellow (lowest priority).

Measurement Results

The collected 3D coordinates of the points (x, y, z) are normalized relative to the center of the field. The center of the field is taken as point (0,0,0).

Axes orientation:



The Z-axis points upward toward the sky from the field surface.

The bottom side in the diagrams is the side closest to the television cameras used for VOL operation.

The collected points are compiled into a text file (TXT). The first line in the file represents the center of the field.