Sphere Mounting

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Detailed Sphere Mounting Instructions

This document describes the recommended process and method for suspending the sphere.

The sphere is suspended from three eyebolts mounted directly in the ceiling by the site. Three suspension wires allow the sphere to find its own stable plane. The angle of the suspension wires should be in the range of 15 to 20 degrees (we recommend 20 degrees). If the angle of the suspension lines from the sphere to the ceiling is too acute, the sphere can be susceptible to vertical instability (bouncing). Too steep an angle can make the sphere susceptible to pendulum instability (swaying).

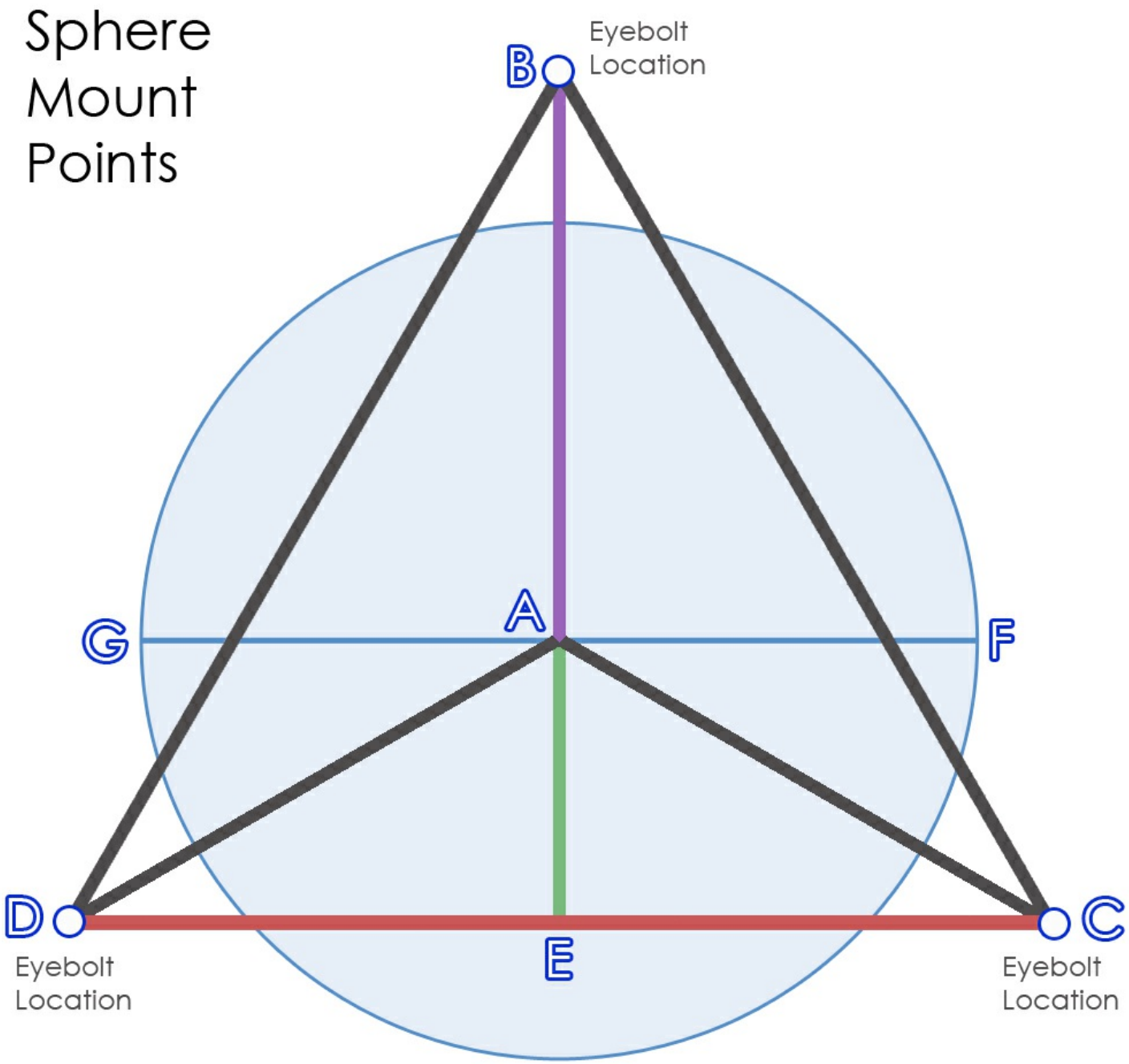
The basic approach is to layout the footprint for the SOS exhibit. The projectors are at the corners of a square, with the sphere positioned in the exact center of that square (see the floorplan diagram for reference). Conceptually, it is easiest to think of the sphere hanging from three points, which are at the corners of an equilateral triangle of some size. The size of the triangle is determined by the angles of the cables coming out of the sphere and the height of the ceiling. Low ceilings require smaller triangles, while high ceilings require larger triangles. The triangle points need to all be on the same plane and that plane needs to be parallel to the floor in order to have sphere hang where you expect it too.

One of the more difficult dimensions to come up with is the length of the sides of the triangle. To simplify the process of determining this length, use either the online Sphere Mount Triangle Calculator below or the provided Microsoft Excel Spreadsheet. Simply input the ceiling height and it will output the parameters needed to create the triangle.

Sphere Mount Triangle Calculator

Here is the calculator. There are two input fields, with the extra one just for comparison purposes. If the calculator isn't working, either update your browser or use the Excel spreadsheet:

Ceiling Height: (ft)



A Complete Example Using 20' High Ceiling

Here is a complete example on how to determine the triangle vertices (corners of the triangle) based on the center of the sphere and a 20' ceiling height. While we're specifically using dimensions appropriate for a 20' ceiling, the same process can be used for any ceiling height by substituting the appropriate dimensions. Look below at the accompanying illustration.

To determine the eyebolt positions, first locate the exact desired position of the center of the sphere and mark it on the floor. The eyebolts should be mounted at three equally-spaced points, each 56” (1.42m) out from the sphere center point, as shown in below.

One way to establish these three equidistant points is to pick the first point 56” (1.42m) from the center point, and mark it on the floor. This corresponds to the lower-left eyebolt location in diagram below. Then draw, or snap, a line on the floor through both the center of the sphere and this first eyebolt location, extending the line well beyond the sphere center on the other side. At a point 28” (.71m) further out from the center, establish a right angle from this

line and snap a second line on the floor perpendicular from the first, as shown. Measure 48 1/2” (1.23m) out from the intersection of the first line in each direction along the second line to position the second and third eyebolt locations.

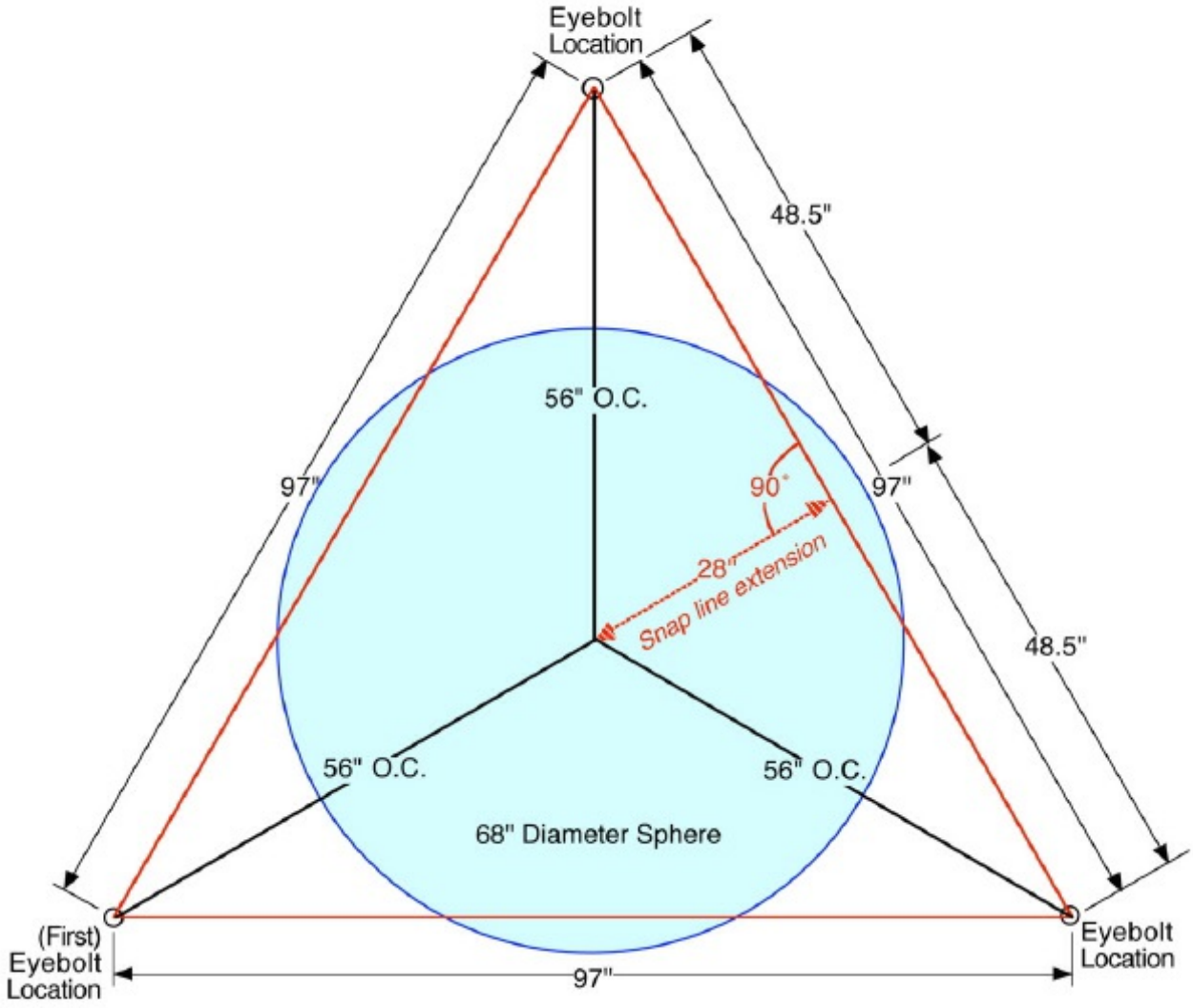
To verify the position of these last two eyebolts, measure their distances from the first eyebolt. This distance should be 97” (2.46m). An error of an inch (2.5cm) or so is probably allowable here.

After marking the eyebolt positions on the floor, use either a laser level or plumb bob to find their actual locations on the ceiling. The eyebolts are installed according to generally accepted procedures. It is a good idea from a safety standpoint to use eyebolts considerably stronger than those needed to support a static 60-pound (22.7kg) load to account for lateral or vertical stress on the sphere due to impact or other physical contact, or in the case of a prone area, earthquakes.

Reference Diagrams

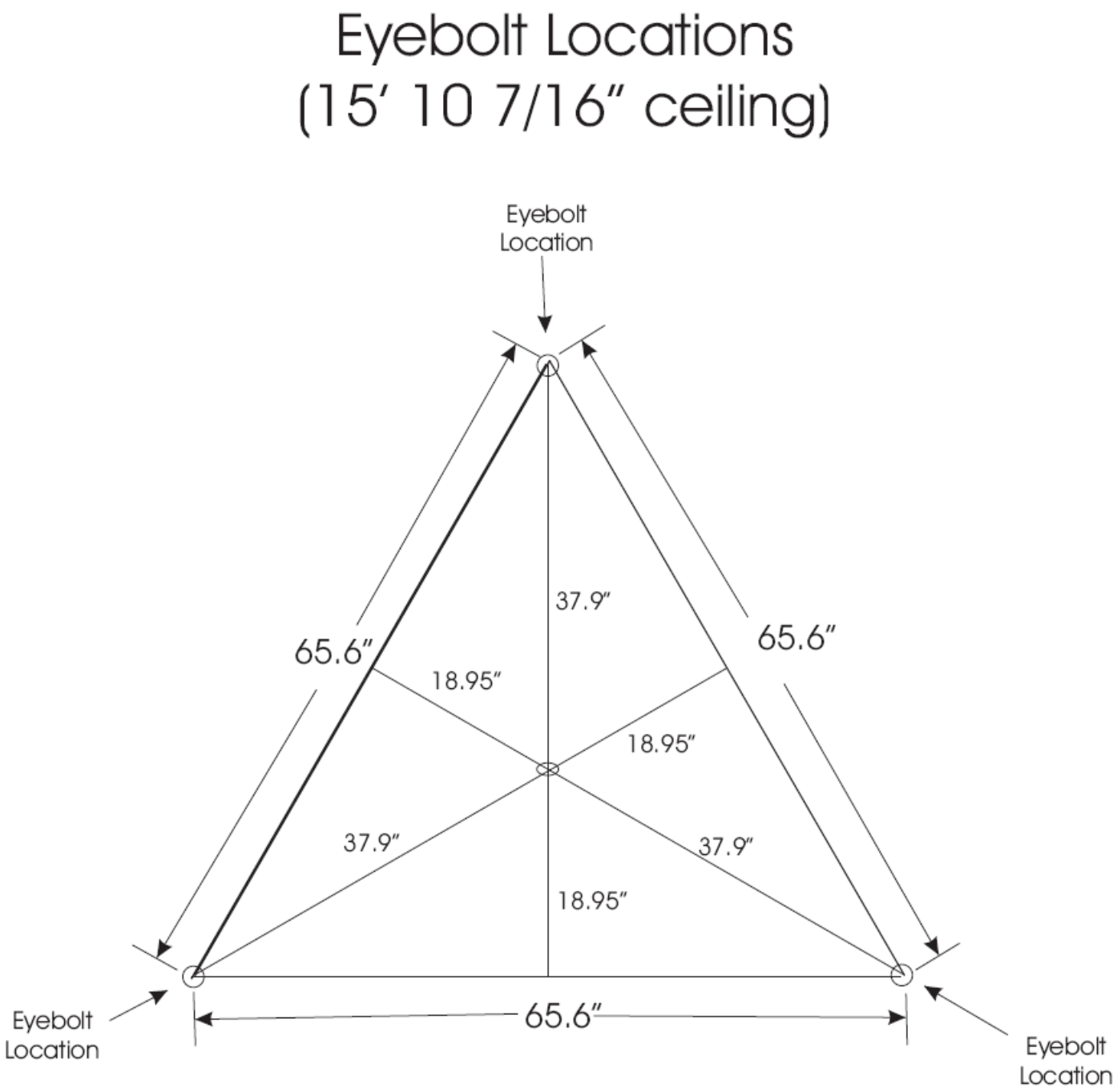
These reference diagrams illustrate how to find the eyebolt locations based up the center of the sphere. These are just samples and your diagram may be different, depending on the height of the ceiling.

Reference Diagram: Sphere Suspended From a 20' Ceiling



Suspension geometry for a 68" sphere from a 20' ceiling height.

Reference Diagram: Sphere Suspended From a 15' 10" Ceiling



Pictures of Sphere Mount Triangle Points

Example 1

Example 2

Example 3

Example 4

Example 5

Example 6