Positioning and Advanced Applications

Application Note

June 2011

OSID by xtralis™

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Preface

This Application Note outlines techniques/methods for optimal positioning of emitters in spatial and multi-emitter sites

This Application Note is intended as a guide to achieving the most out of an OSID system using multiple emitters and demonstrating the superiority of an OSID system compared to a one on one beam installation.

Related Products

Product	Description
OSI-10	Imager - 10º coverage
OSI-45	Imager - 38º coverage
OSI-90	Imager - 80º coverage
OSE-SP	Emitter - Standard Power
OSE-SPW	Emitter - Standard Power, Wired
OSE-HPW	Emitter - High Power, Wired
OSID-INST	Installation and maintenance kit

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Introduction

The OSID system offers many important extended features when compared to traditional or auto-aligning beam detectors. For example, the spatial capabilities of OSID allow the Emitters to be placed in 3D planes that provide dense detection mesh. This detection mesh provides an absolute coverage for high risk applications in a cost effective way. Figure 1 below shows an OSID detection mesh in an auditorium.

The following are some of the other important features of OSID:

- Reduced installation wiring and complexity
- Reduced total cost of ownership
- High tolerance to building movement (raises a fault not an alarm)
- High resistance to dust and dirt (raises a fault not an alarm)
- Little affected by fog, steam and vapour (raises a fault not an alarm)
- Unaffected by ambient light

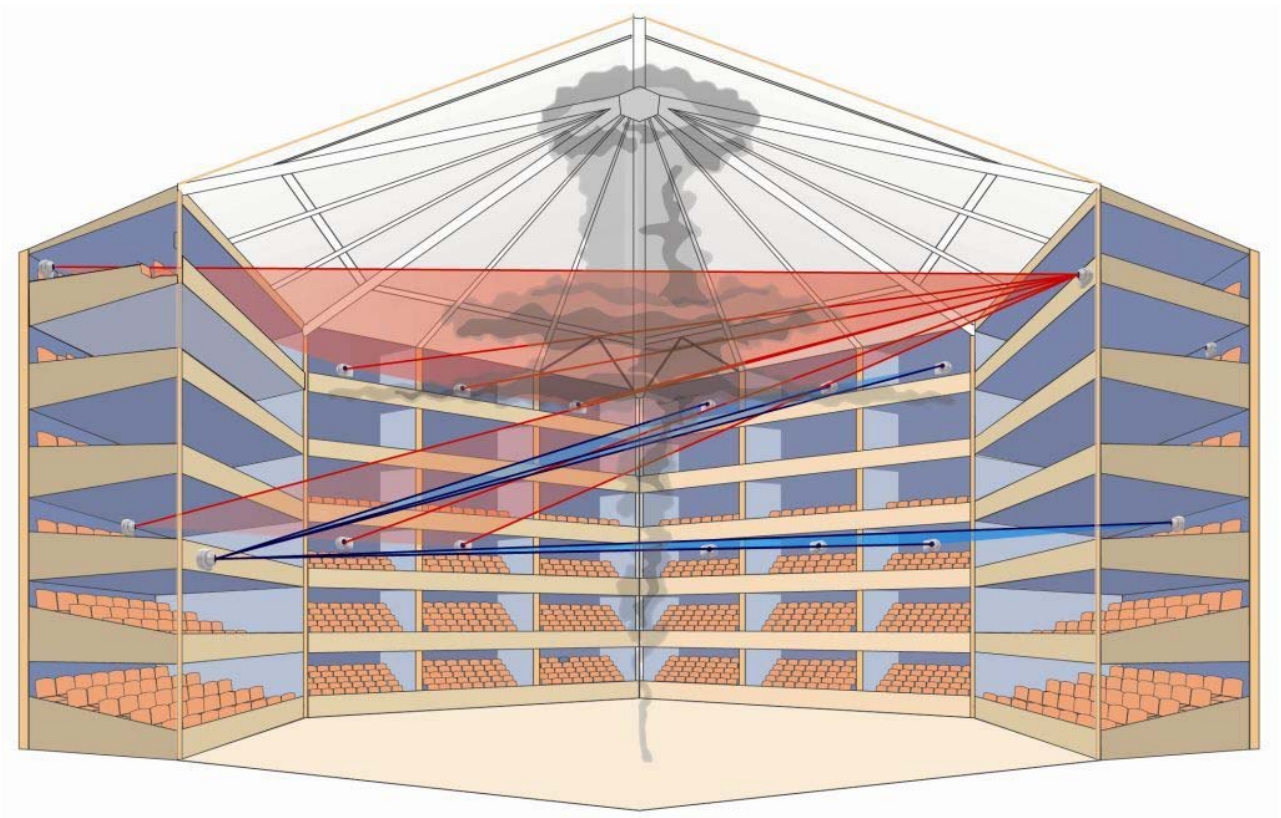


Figure 1: OSID System

Minimum Fire Detection Requirements

Earlier detection of fire emergencies provided by OSID allows earlier and safer evacuation of people, and increase the level of protection of properties. These earlier detection capabilities are beyond the minimum fire detection capability imposed by regulatory codes, fire brigade or insurance companies.

Figure 2 below shows an auditorium protected by minimum fire detection requirements imposed by regulatory codes and standards for a multi-emitter solution. Depending on area height and local codes, this area could be protected with one or 2 layers of beam detection. For this example one layer of beam detection is required.

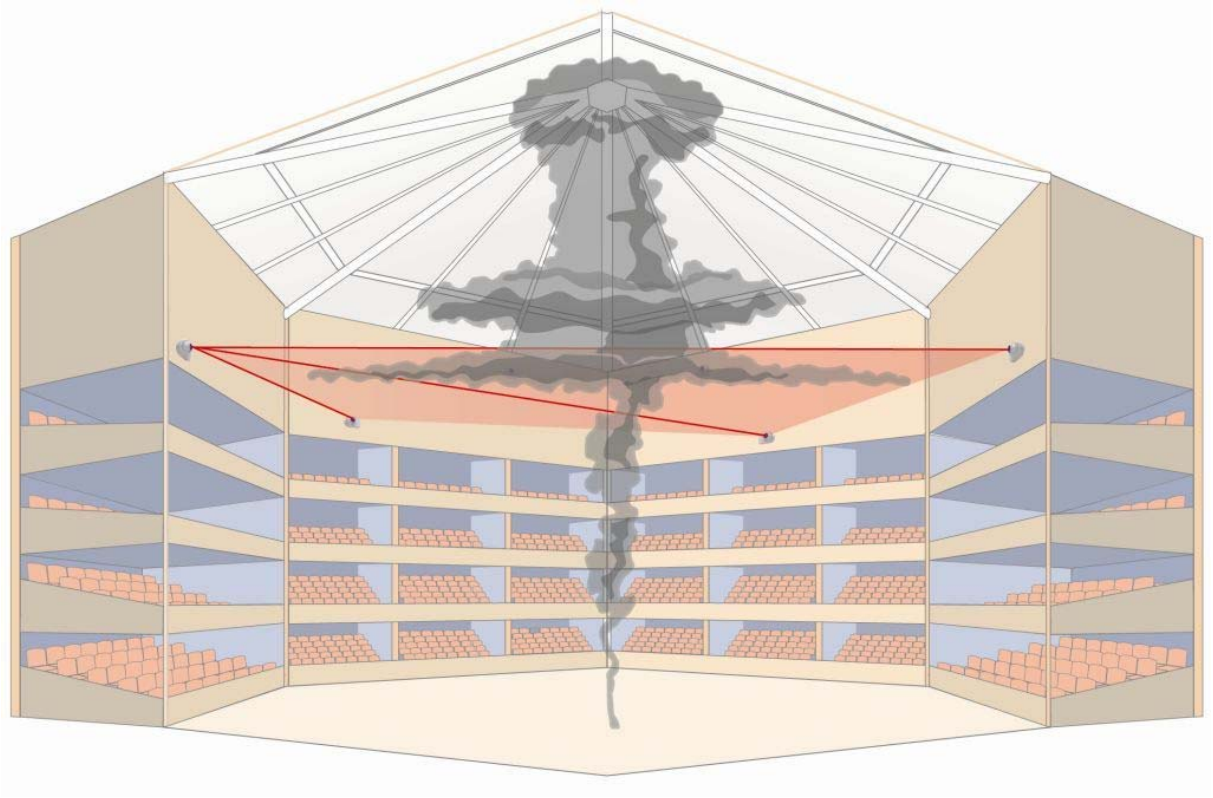


Figure 2: Minimum Fire Detection Requirements

Advantage of OSID

Although the initial cost of the OSID system is higher than traditional or auto-aligning beam detectors, this is justified by the extended features offered by OSID.

Using OSID in a multi-emitter deployment actually shows that the value proposition is as good and can be even better than one-on-one beam installations.

General Considerations

OSID is designed to comply with and be approved to the product standards for “beam” detectors (e.g. EN54-12, UL268). This means the OSID system design and installation must comply with local codes and regulations for projected beams (NFPA, GB 50116-98). The local codes and regulations prescribe:

- Beam spacing
- Distance below ceiling
- Distance to walls
- Maximum beam length
- Maximum supervised surface/area
- Deployment in apex ceilings

For multiple emitters (lines of protection) make sure that the covered areas at the emitters are compliant with local codes and regulations.

Basic Rules

The following guides to good craftsmanship should be complied with.

- Include no obstructions between the Emitter and Imager
- Ensure the system is mounted well above the head height of a person
- Mount both imager and emitter on solid parts of the building such as the main support structure
- Avoid direct sunlight into the imager unit. The imager may be installed in a location where direct sunlight occurs but the sun should never come into the field of view of the imager. If direct sunlight cannot be avoided, place imager higher than the emitters to force the imager to look below the horizon. Avoid the imager facing the rising and setting sun, install North-South.
- Consider effects like stratification and other parameters that may affect the performance of the detector (e.g. room geometry, ceiling height, ceiling shape, …)

Where Not to Install OSID

OSID has a high resistance to dust and dirt. This does not mean that OSID can be installed in all extremely challenging environments. Follow the rules below. If OSID does not correspond to the criteria use ASD detectors that are especially developed and equipped for such extreme environments.

- Verify upfront if the environment is suitable for OSID (level of dust, dirt, steam, fog, ...)
- Check background level:
  - Use the OSM (OSID System Monitor) software package to evaluate if the maximum ambient level (level of dust, dirt, etc) is within the OSID limits and determine optimum sensitivity setting

Positioning Multiple Emitters

Square and Rectangular Shaped Areas

The Optimum Way

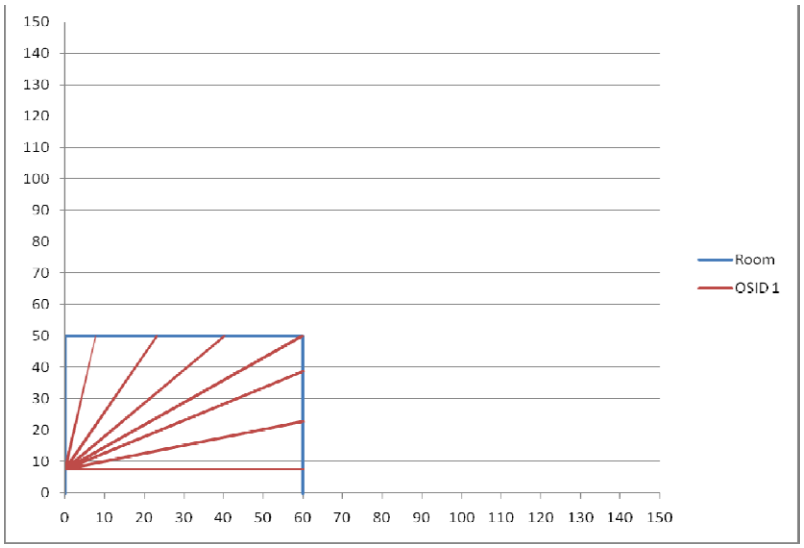
If the surface is rectangular or square, the EPS (Emitter Positioning System) will indicate the exact position and amount of emitters as well as the number of imagers required.

Please refer to the EPS program for detail and use.

The result of this exercise is that you will use the minimum number of emitters/imagers and have a compliant system in a few of minutes. EPS will equally provide you the comparison with both traditional and OSID one-on-one beam solutions as well as a cost comparison of the solutions.

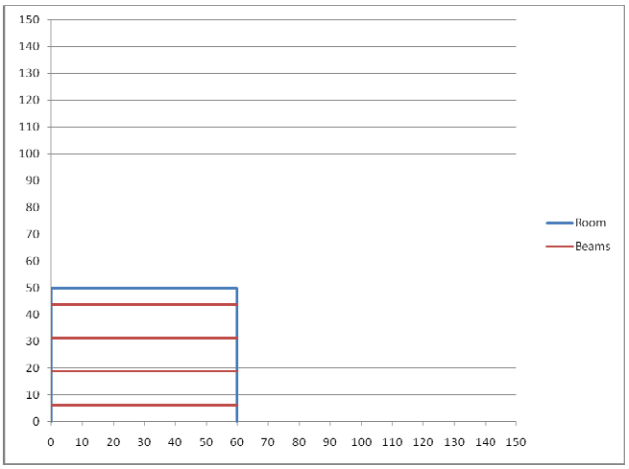
The result of the EPS calculation is shown on a graph in an Excel spreadsheet that is illustrated below.

The program prevents that you exceed the maximum allowed beam length (X), depending on type of emitters and imagers used, as well as the maximum allowed beam coverage and width (Y).

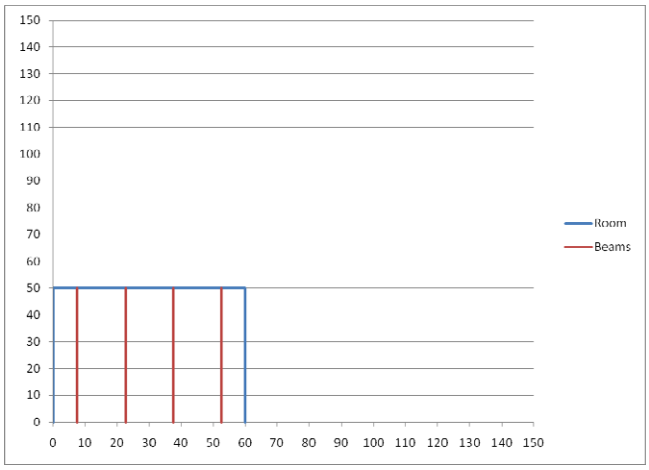


The program will also provide the exact location of the various emitters along the walls.

OSID multi emitter



Horizontal beams

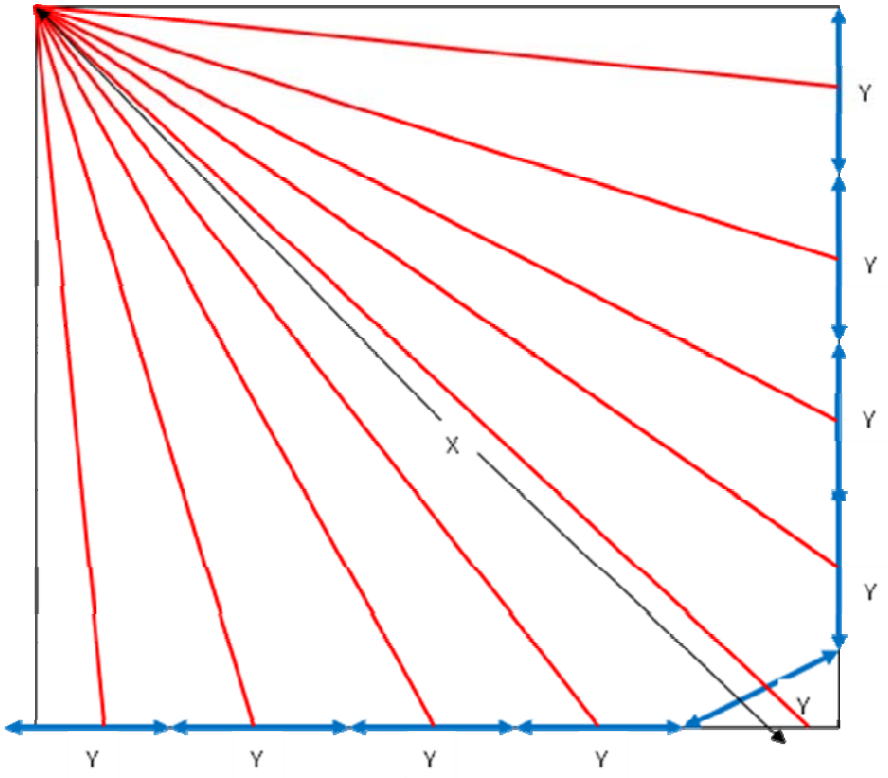


Vertical beams

The Alternative Way

If you do not have the program at hand proceed as follows.

- Make sure you have the right dimensions of your floor plan.
- Use the following convention:
- X = Beam length, both allowed by local codes and within the emitter range specs (see below).
- Y = Beam coverage, width allowed by local codes
- Standard emitters and high powered emitters can be mixed on any installation.
- Same goes for wired and battery powered emitters.



Proceed as follows; place the imager(s) in the most appropriate corner with regard to geometry and minimum wiring. Then set out Y values on the opposite walls.

You now put an emitter in the middle of each Y section.

The number of Y sections also determines how many imagers are required, based on the type of imager you chose, 38° FOV or 80° FOV.

Available Combinations Imager and Emitter

Imagers	Emitters	
Field of View	Maximum Detection Range	
	Standard	High Power
7°	150 m (492 ft)	-
38°	60 m (197 ft)	120 m (393 ft)
80°	34 m (111 ft)	68 m (223 ft)

Irregular Shaped Areas

Proceed as above with regard to the rules and regulations.

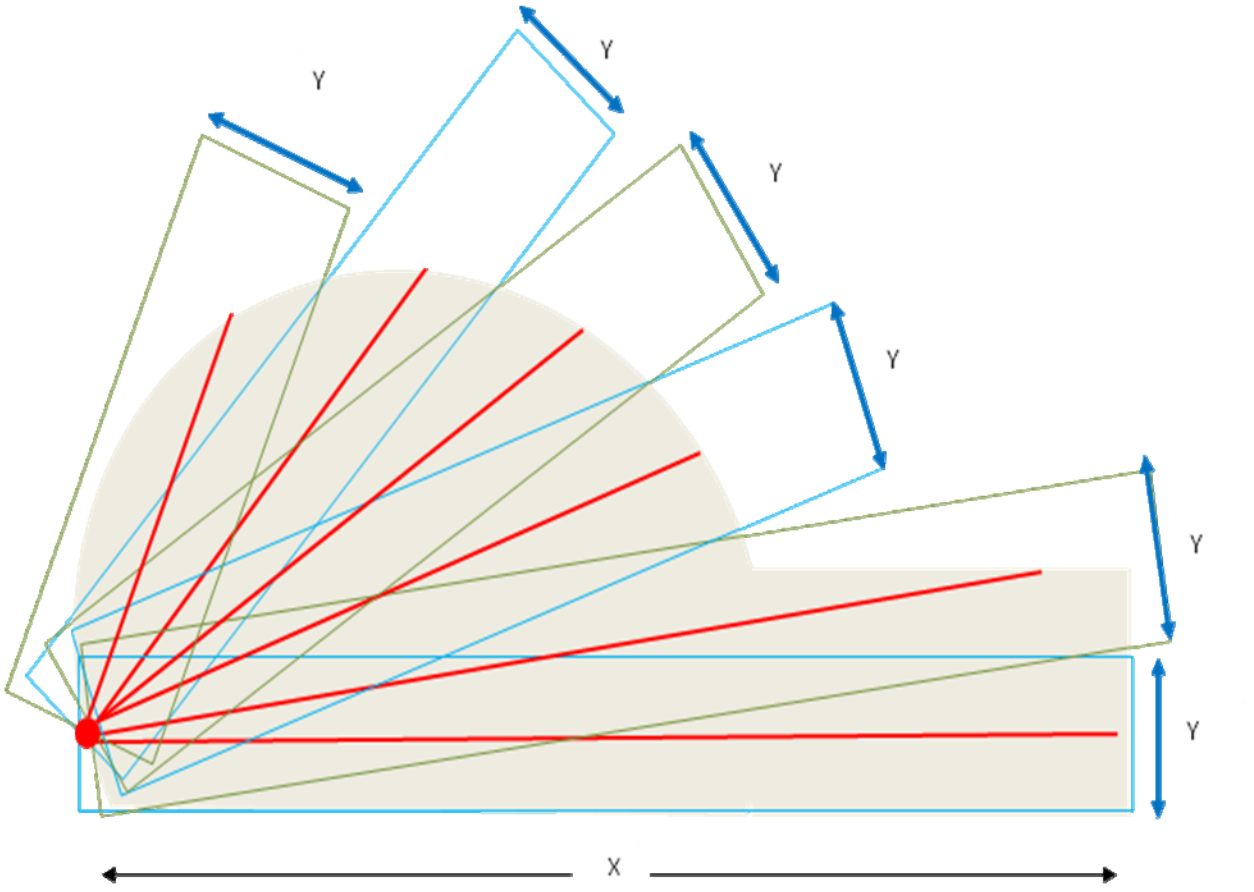
Or use the alternative way described above or cut out of a piece of paper a rectangle of the size corresponding to beam width and length. Respect the scale and dimensions.

Place the imager(s) in the most appropriate corner with regard to geometry and minimum wiring and set out the coverage section as per drawing below.

X = Beam length, both allowed by local codes and within the emitter range specs (see below).

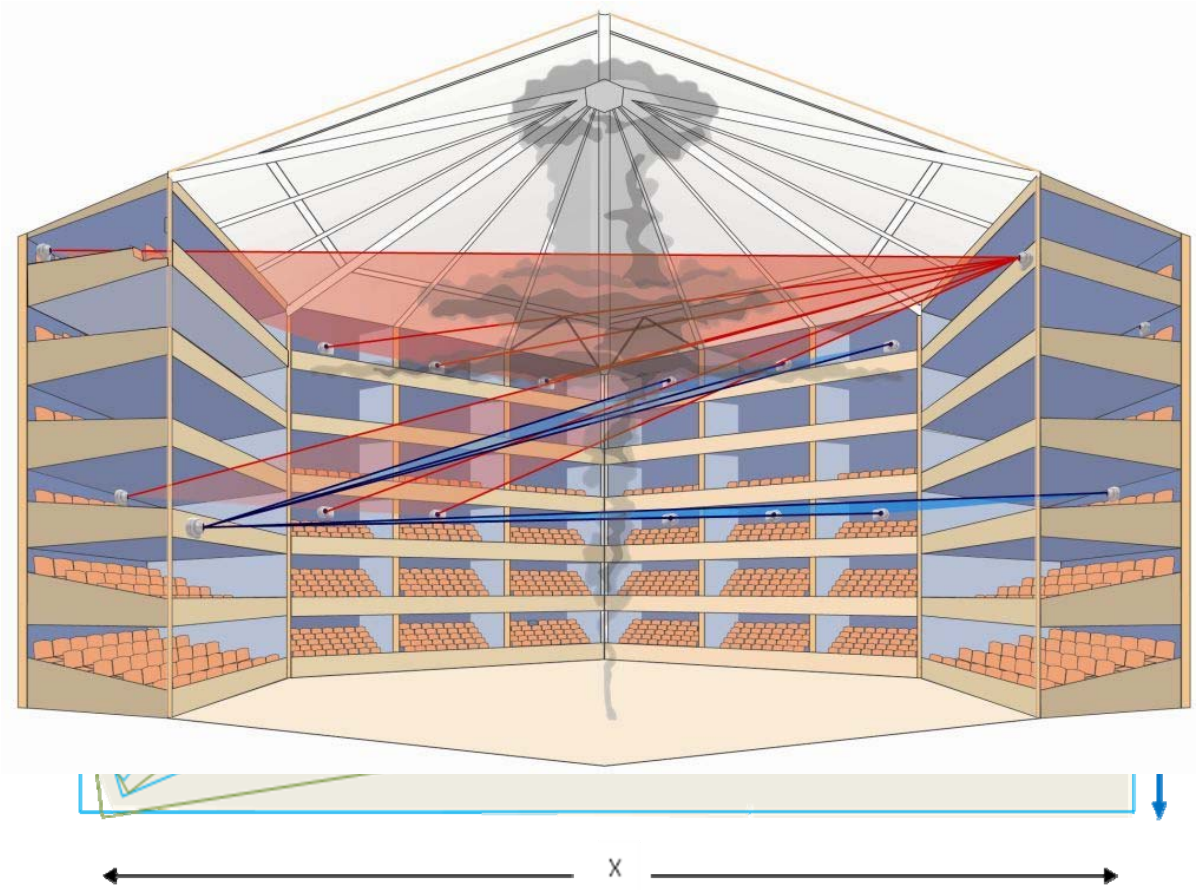
Y = Beam coverage, width allowed by local codes

In this way you achieve the optimum spacing and coverage.

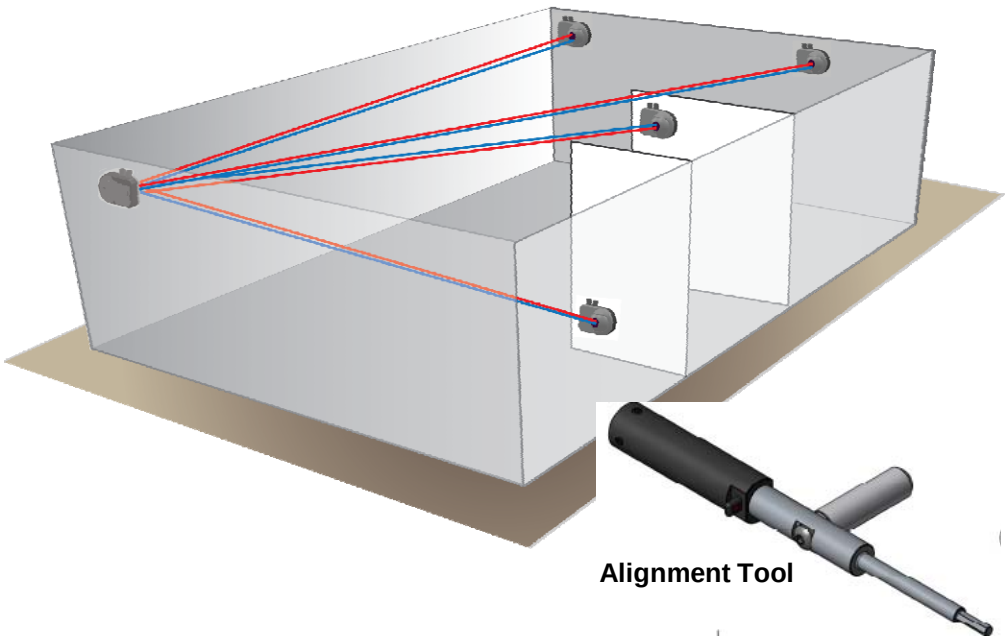

Y
Y
Y
Y
Y
Y
X

OSID Spatial Capabilities

The spatial capabilities of OSID allow the Emitters to be placed in a 3D plane that provides a dense detection mesh. This detection mesh provides an absolute coverage for high risk applications in a cost effective way. The figure below shows an OSID detection mesh in an auditorium.



Verifying the Emitter Locations



Alignment Tool

When on site doing the installation, control the locations and direction of both the imager and the emitters by using the alignment tools, see also installation manual. Emitters do not need to be on the same height. The location of the emitters can be adapted depending on obstructions that were not visible on the floor plans while designing the system. The actual horizontal and vertical freedom, per type of imager, is available in the installation guide

Using your laptop and the *OSID System Monitor* (OSM) software, you can acquire an image and check exactly what the imager is 'seeing'. Make sure all emitters are accounted for on the screen.

Typical Example of OSID versus Traditional Beam

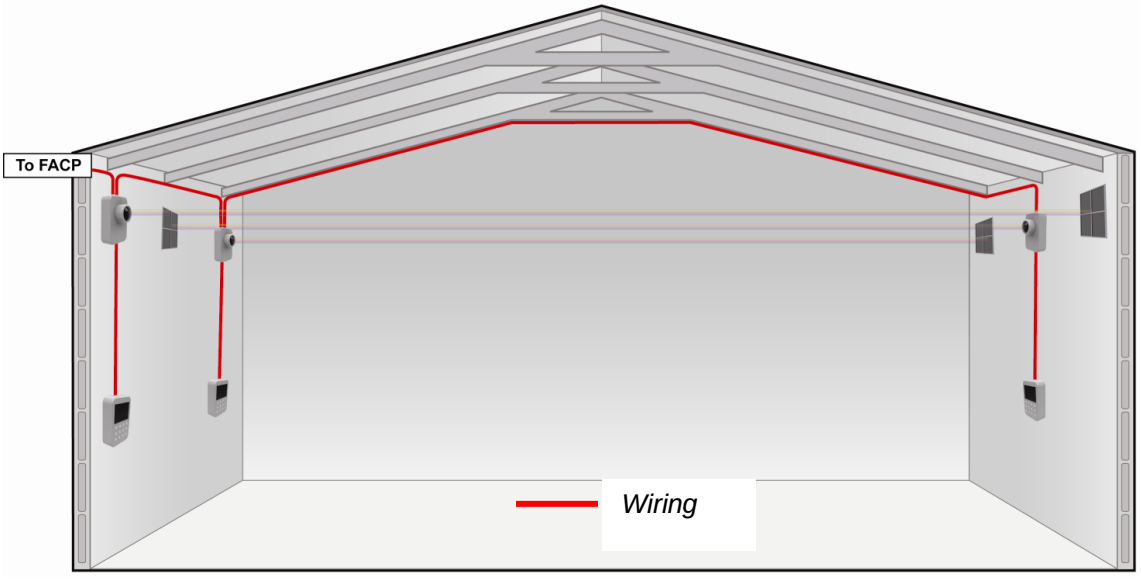
The strength of OSID multi-emitters applications is in the considerable savings of wiring and labor.

Below the drawings of the typical wiring for traditional beams versus OSID wiring. Some beams may come without a control unit at ground level.

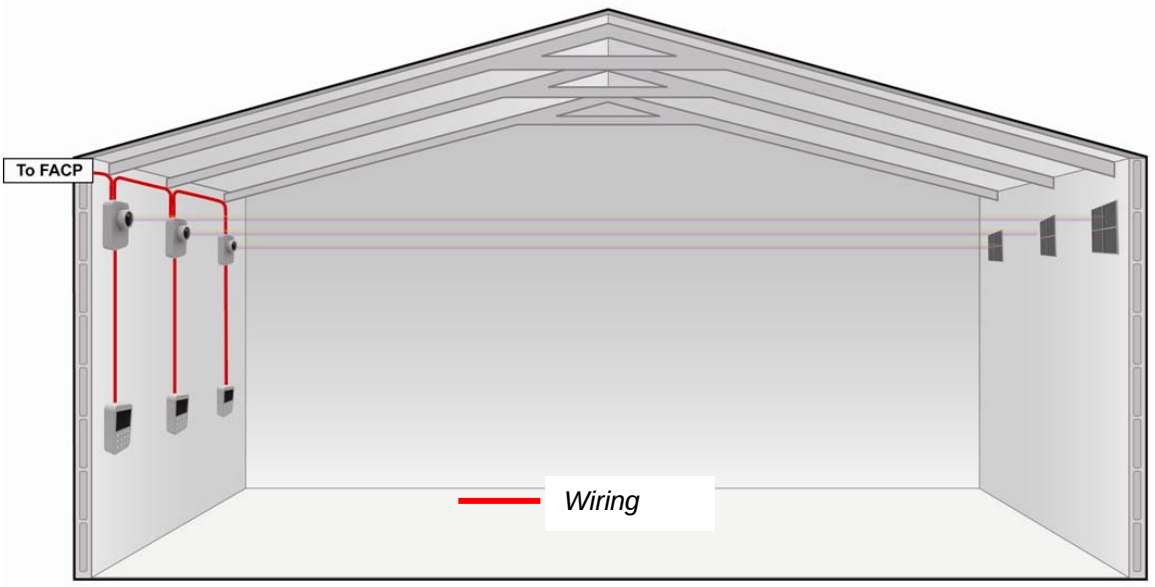
Non-auto aligning beams will alternate TX and RX to avoid cross talk of the signals.

These beam installations are taking close to double of the wiring for auto-aligning beams.

Even auto-aligning beams require a magnitude more wiring and labor that OSID.

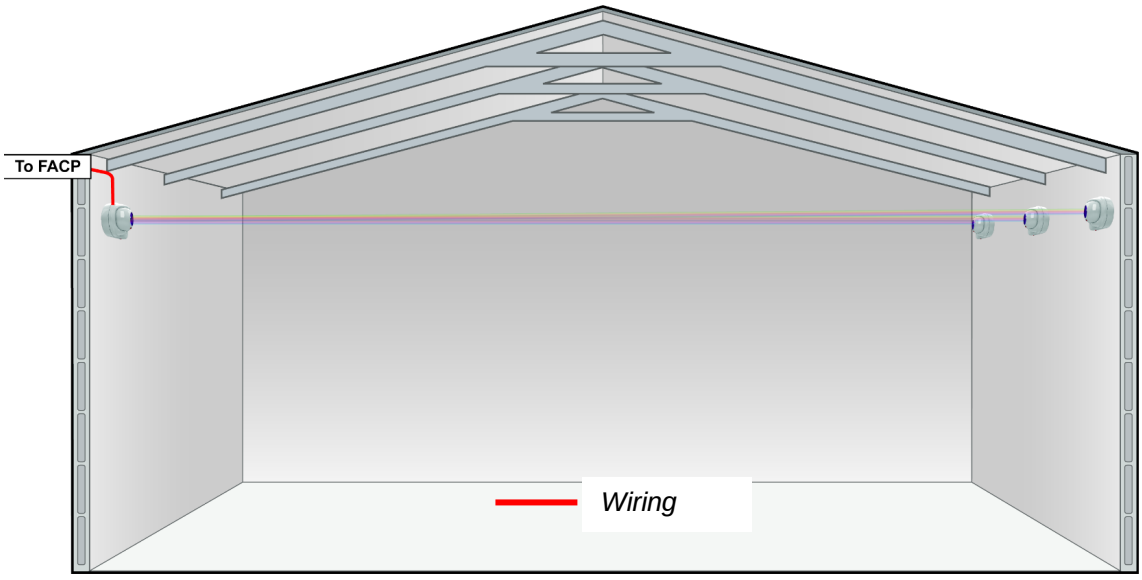


Traditional Beam



Auto-aligning Beam

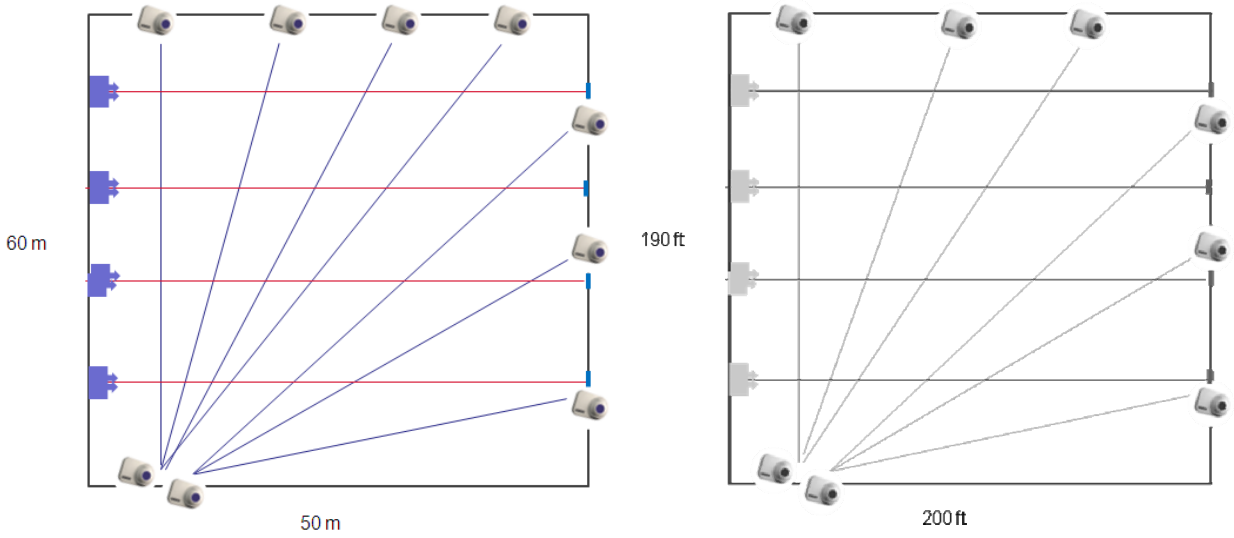
Below a typical application of multi-emitter OSID implementation



OSID multi-emitter

In this 50x60 area, 2 imagers and 7 emitters replace 4 traditional beams. The net result is that the OSID installation is considerable less expensive than traditional beams, whether auto-aligning or not. An interesting point is that a second imager is only added to comply with codes that stipulate maximum area coverage for beam detectors. This area coverage varies from 1,000 to 2,000 m^2 depending on the local territory codes, the maximum area coverage for US is 20,000 sq ft. These coverage areas may change with future coming standards revisions as technology progresses faster than standards.

For UL standards in this 50 m (190 ft) x 60m (200 ft) area, 2 imagers and 6 emitters replace 4 traditional beams. The result is even better.



Increasing the OSID Detection Capabilities using OSID's Spatial Capabilities

Typically in atria of shopping malls or theatres a customer may favor earlier detection over the imposed minimum detection by codes, fire brigade or insurance company.

This can be for earlier, hence safer, evacuation or for extra protection of valuables.

Note that extra emitters can be added at any time after the initial installation up to the maximum supported by that imager model.

Follow the guidelines set out in the installation manual.

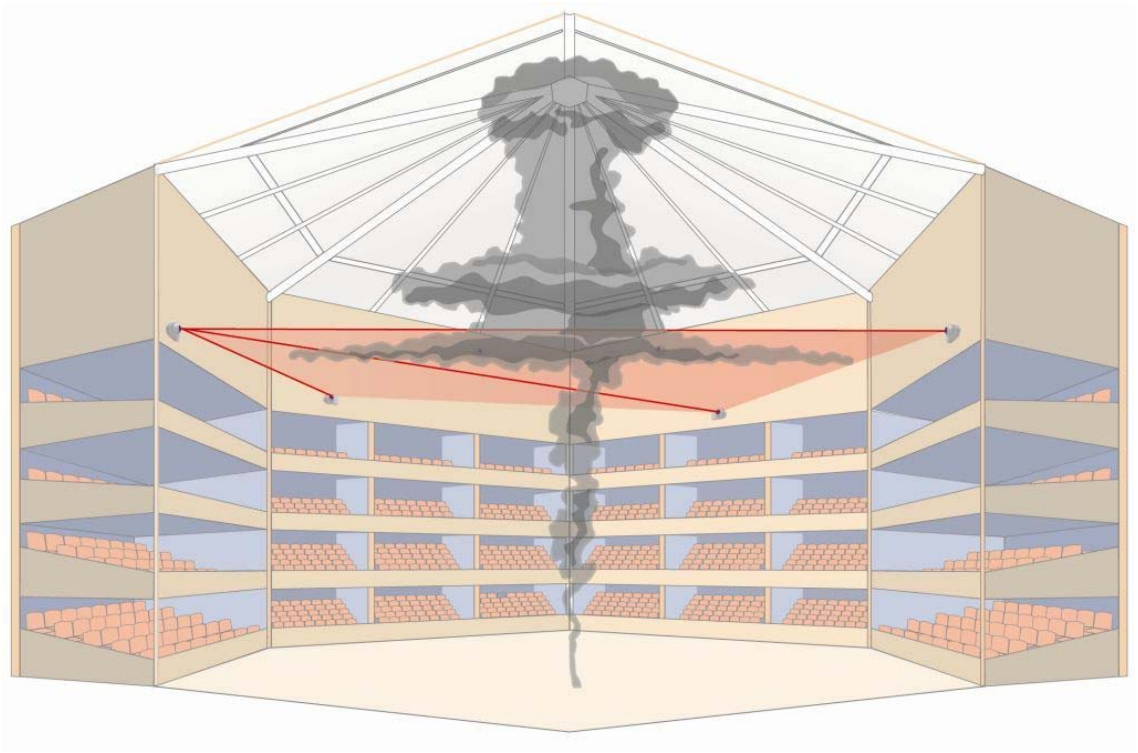
Minimum Requirements

Let's examine a typical example of a shopping mall atrium.

Depending on the height and the local codes the area could be protected with one or 2 layers of beams.

For the sake of this example let's assume one layer.

The minimum coverage required by codes and standards for a multi-emitter solution will look as below.

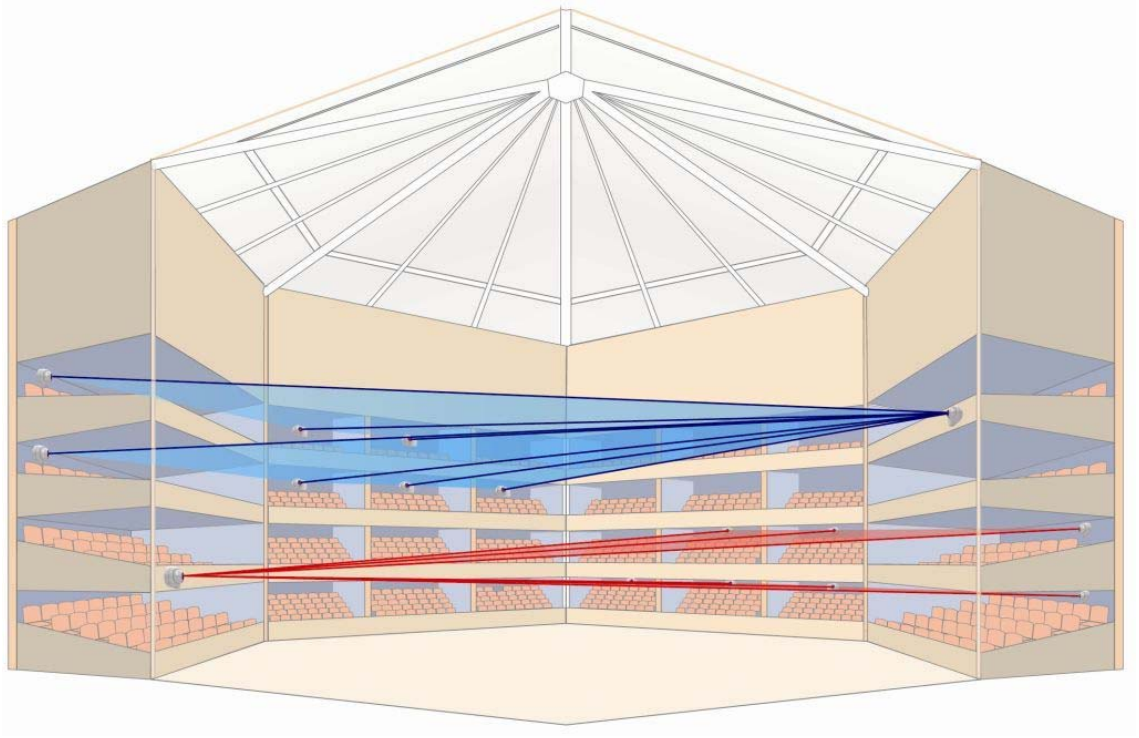


Minimum required coverage by codes

Increased Coverage and Earlier Detection

The unique ability of OSID to position its emitters in a 3 dimensional space allows providing the customer with a dense detection mesh in a cost-effective way for an absolute coverage in high risk applications.

One way of proceeding is as per below.



Further Support

Contact an Xtralis office or distributor for further information.

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