Application Guide

Sensor Positioning

Revision 02

Contents

About this document

This single-topic guide outlines general principles for Dynalite sensor placement, and provides example floor plans for a variety of applications.

For additional information on Dynalite sensors, please refer to the **Dynalite Networked Sensors** brochure, device specification sheets, and installation instructions.

Disclaimer

This document has been prepared by Philips Dynalite and provide information on products for use by registered partners or owners. Some information may become superseded through changes to the law and as a result of evolving technology and industry practices. Any reference to non-Philips products or web links does not constitute an endorsement of those products or services.

This guide's approach is generic in nature. Depending on the geographic location of the building, there may be national, regional, and local electrical and occupancy regulations to consider in the planning, implementation, and installation of the Dynalite system.

Copyright

1 General considerations

Take the following factors into account when deciding where to place each sensor:

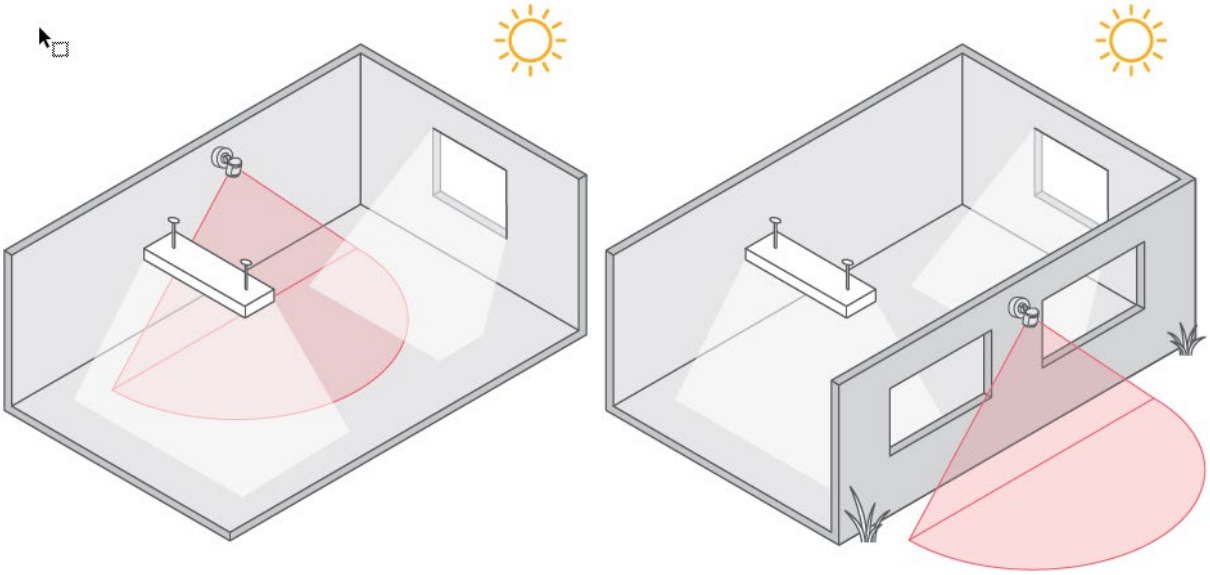
- HVAC and RF interference
- Direct/reflected sunlight
- Doorways

1.1 HVAC and RF interference

Dynalite sensors should be placed at least 2m away from HVAC equipment, ventilation outlets, and RF sources such as Wi-Fi access points.

1.2 Direct/reflected sunlight

For useful light level readings, the sensor should face a surface that represents the typical lighting levels of the surrounding area. The sensor should only detect reflected light, and should not be in the direct path of any light source, natural (sunlight) or artificial (lamps, fixtures or displays).

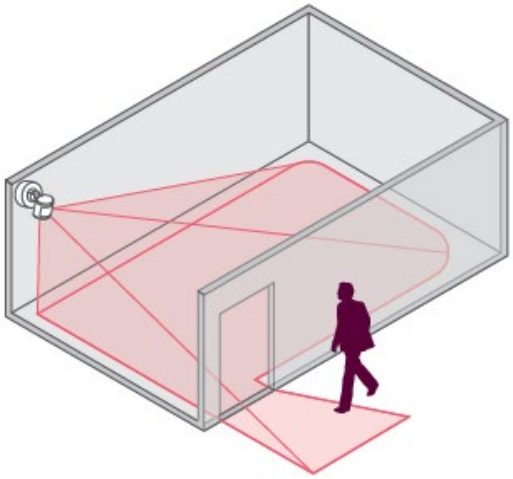


1.3 Doorways

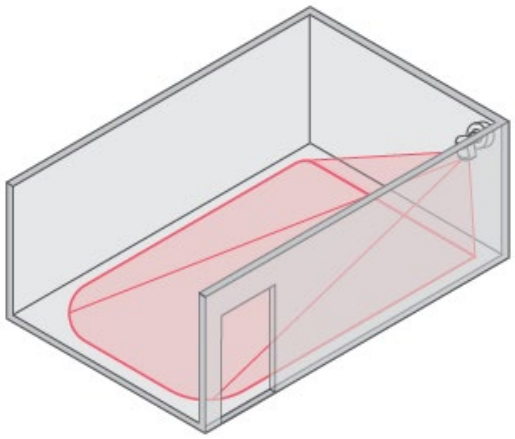
30° and 90° Sensors

Positioning a sensor facing an open doorway may result in false triggering whenever someone walks by outside a room. To detect people as they enter the room, we recommend mounting a 30° or 90° sensor on the same wall, facing across the doorway.

Beam through doorway



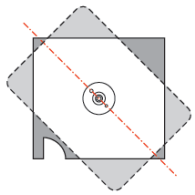
Beam across doorway



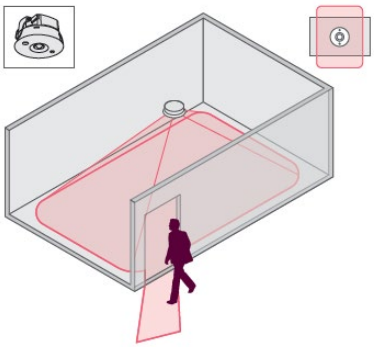
360° Sensors

To avoid accidental triggering of ceiling-mounted 360° sensors, either position and orient the sensor to avoid the doorway, or pull down and rotate the PIR masking bezel to block a 120° slice of the sensor beam footprint.

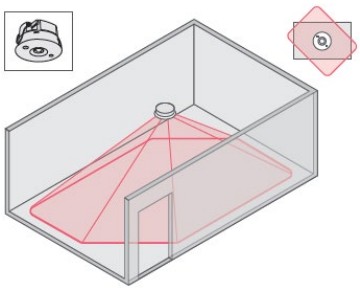
Dynalite 360° sensors' have their service LED and PE sensor aligned with the long axis of their detection area. This makes it easy to install the sensor in the preferred orientation.



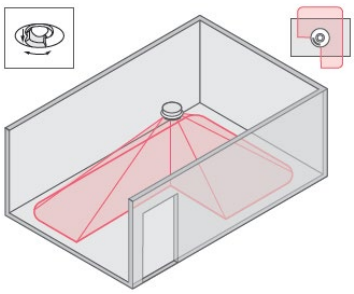
Beam through doorway



Oriented to avoid doorway



PIR masking bezel



2 Example Floor Plans

The floorplans provided here show how our networked sensors work, individually or in concert, to provide occupancy monitoring to the Dynalite system in a variety of typical deployment scenarios.

However, please note the following as you browse this section:

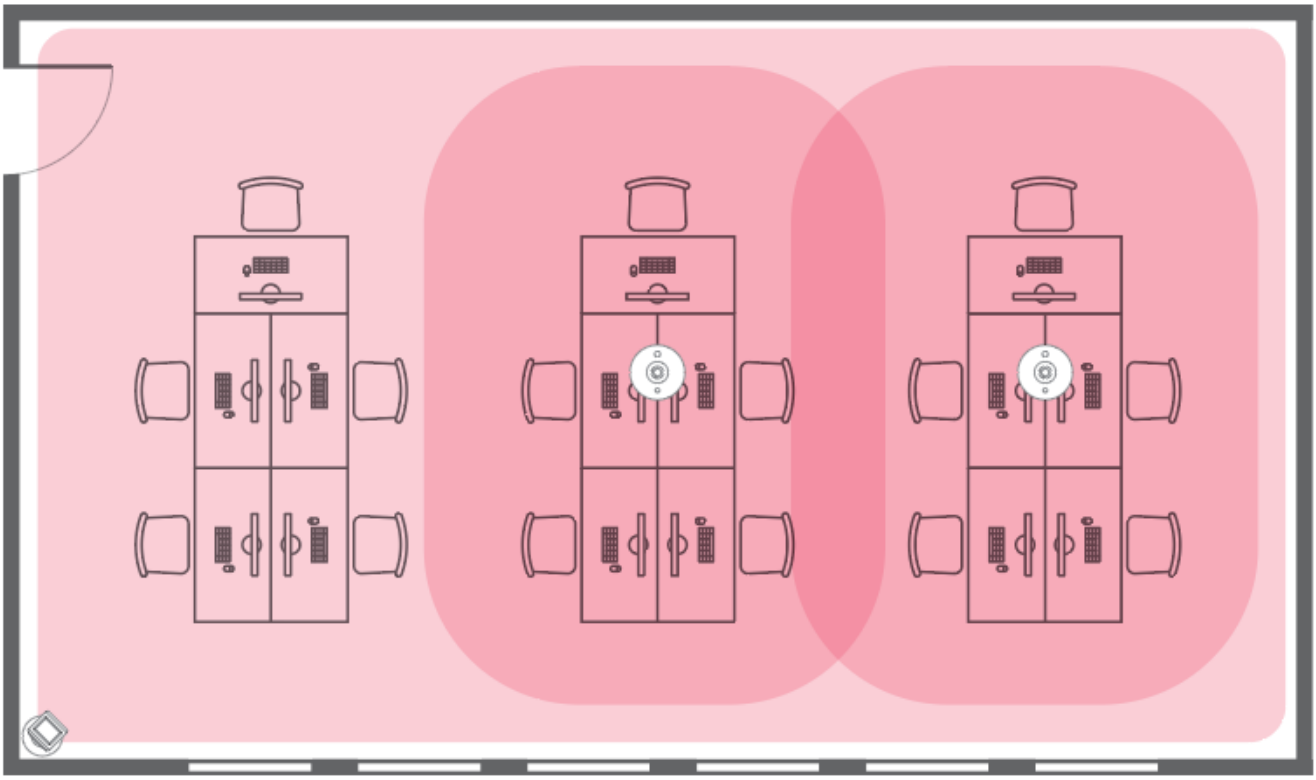
- These examples are indicative only. They are not tailored to your specific project.
- Sensor detection footprints are approximate in shape and scale, and do not account for factors such as precise mounting height, ambient temperature, lighting conditions, or external interference.
- Refer to each sensor's specification sheet and consider your project's unique requirements and challenges before finalizing your device selection and layout.

2.1 Open-Plan Office

In this example, a DUS90CS covers the entrance and detects motion within the office but cannot be falsely triggered by movement outside. The 90° sensor is sensitive enough at close range to provide coverage of the nearest desk pod.

A 360° sensor sits over each of the other pods, providing additional occupancy detection at the desks and surrounding foot traffic areas. The 360° sensors' proximity to the windows also allows them to perform daylight harvesting functions.

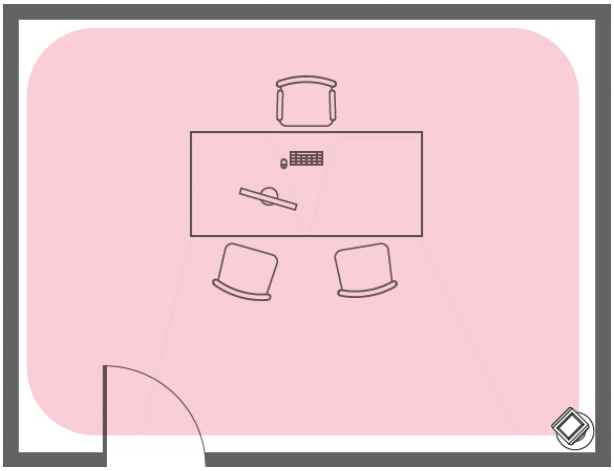
Open-plan offices do not need 100% coverage (e.g., middle of desks), but reliable motion detection in aisles and seated positions is essential.

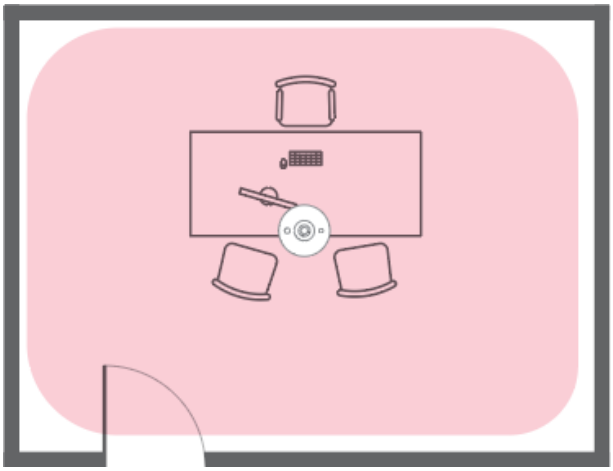


2.2 Single Office

A single DUS90CS in one corner is sufficient to cover this entire room. Mounting the sensor along the same wall as the door eliminates false triggering from movement outside the office.

A ceiling-mounted 360° sensor may be a suitable alternative, depending on external foot traffic and how the room is used.

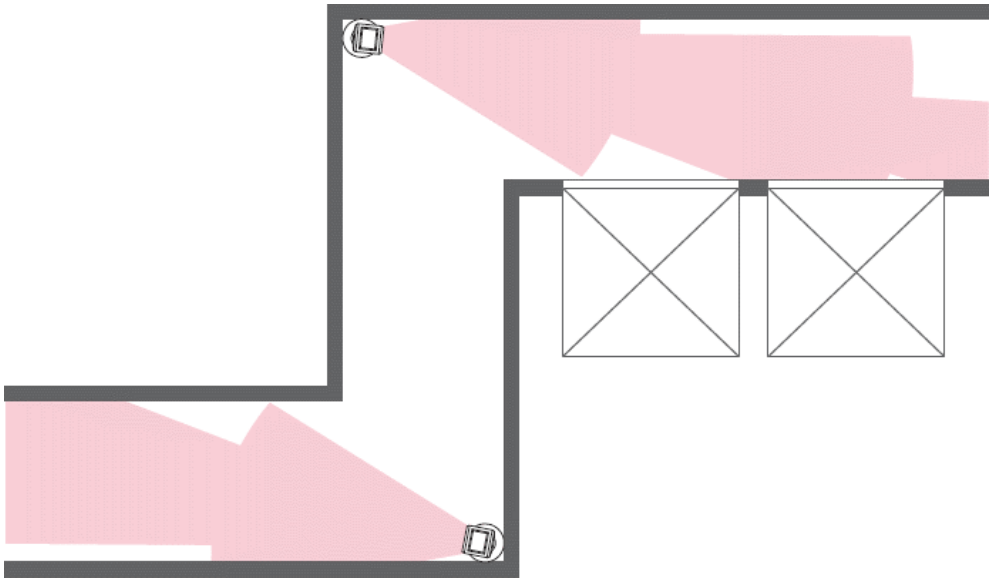




2.3 Angled Corridor

30° long-range sensors (DUS30CS, or the DUS30LHB-D for high bay DALI installations) are positioned to detect people exiting the two elevators or approaching from either direction.

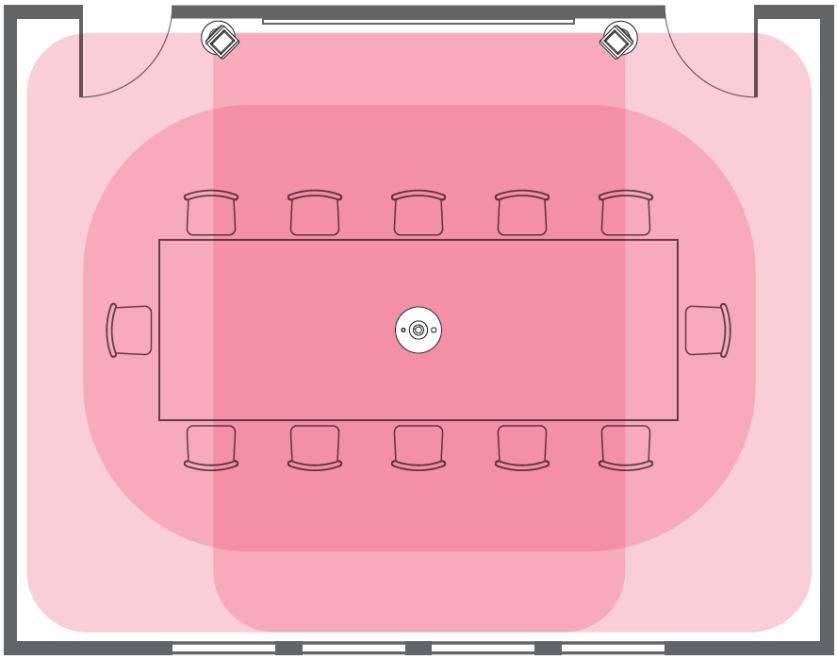
The blind spot between the two sensors here contains no infrastructure or other means of access, so 100% coverage is not necessary. If needed, a third sensor can easily be added to the system.



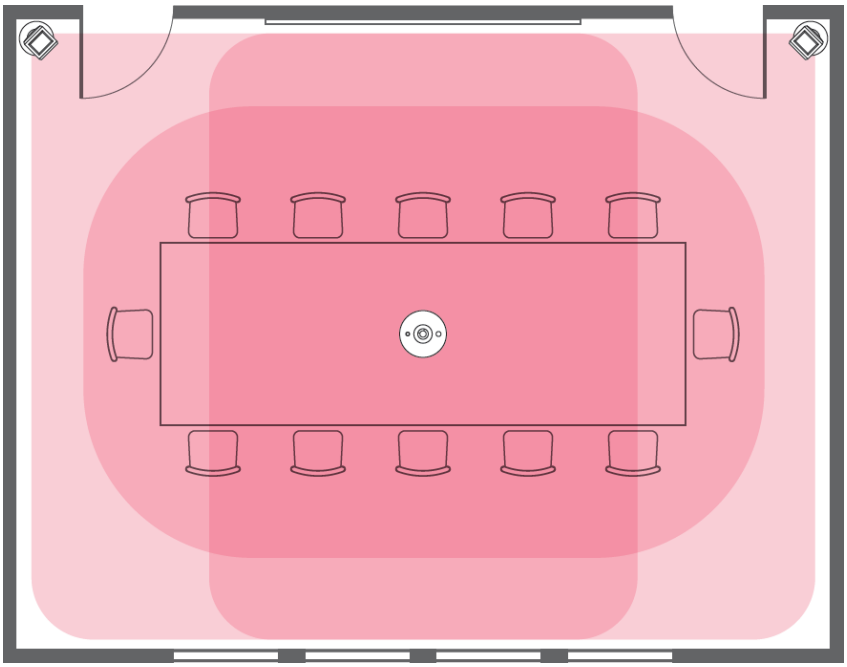
2.4 Conference/Board Room

Two DUS90CS sensors on the same wall as the doorways provide general coverage of the entire room. A 360° sensor over the conference table ensures greater sensitivity to small movements from seated occupants, as well as providing daylight harvesting functionality if the room receives natural light.

For conference rooms with higher doors that may block the 90° sensor beam when open, positioning the sensors as shown below ensures that occupants are detected as soon as they enter the room.



In spaces with lower doors, the 90° sensors can be positioned unobtrusively in the corners of the room.



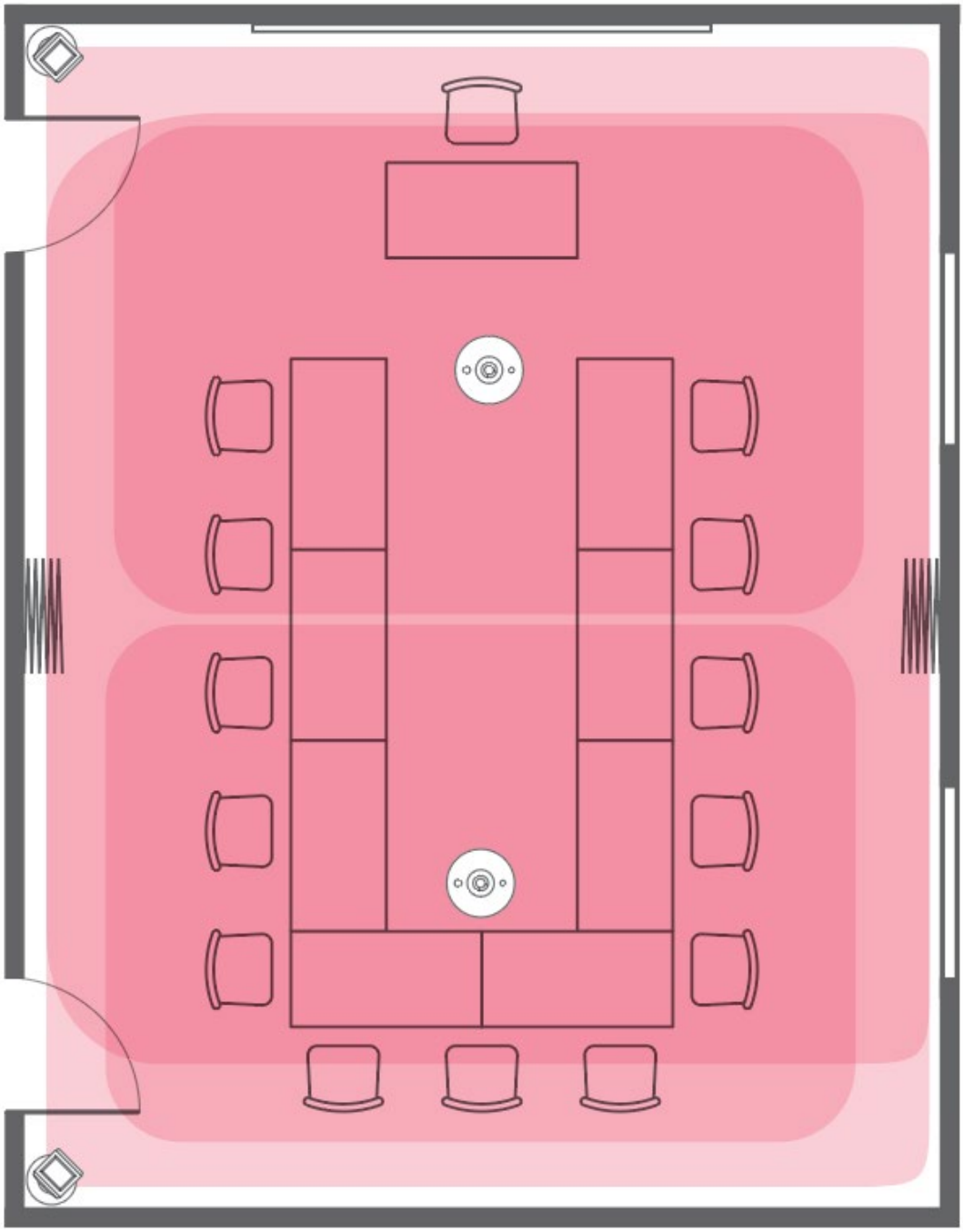
In smaller rooms, a single 360° sensor may provide sufficient coverage without any additional 90° sensors.

2.5 Training Room

This is a large room with a central divider that splits it in half when closed. As with the conference room in the previous example, consider the placement and angle of the DUS90CS sensors in relation to doorways, especially with taller doors that may block the sensor beam when open.

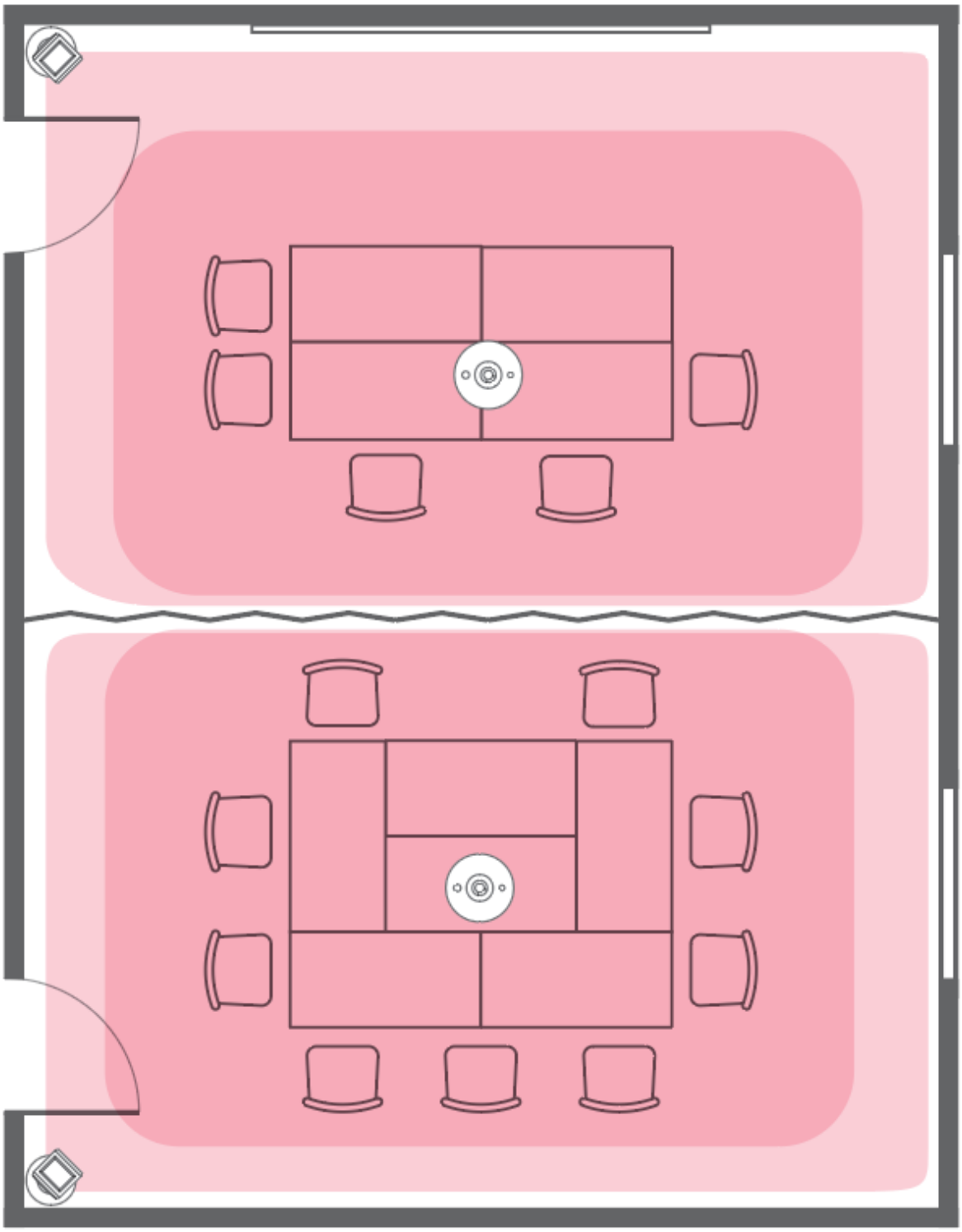
Divider Open

The DUS90CS sensors detect anyone entering from either of the two entrances, and have enough range to detect people walking around the outer edges of the room. The central 360° sensors provide daylight harvesting and detection of smaller movements from seated occupants.



Divider Closed

When the dividing screen is closed to split the room into two areas, a dry contact switch notifies the Dynalite system. This prompts the sensors in each space to operate independently, affecting only the lighting, HVAC, etc. in their own areas until the screen is reopened.



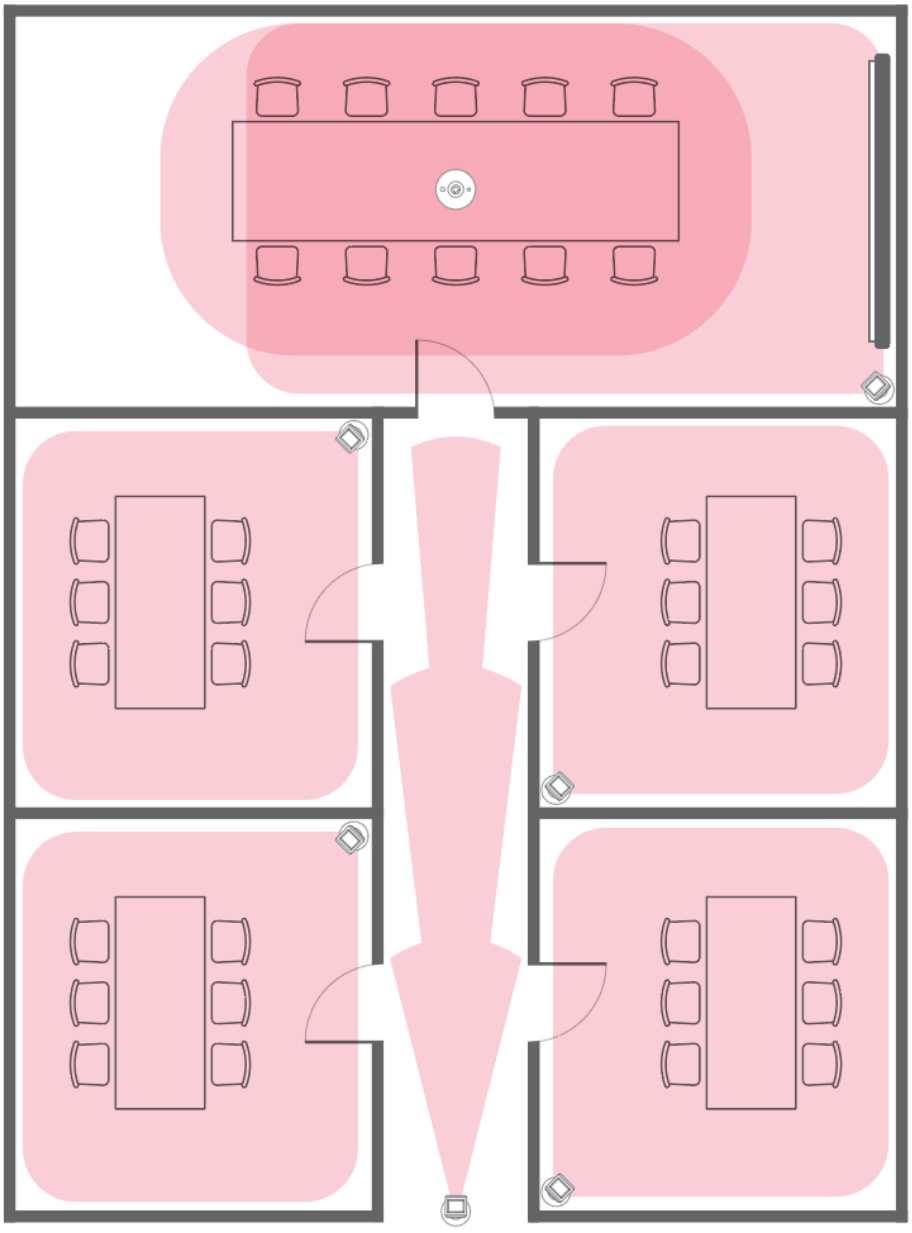
2.6 Meeting Rooms with Shared Corridor

While offices and meeting rooms are generally covered by 90° and 360° sensors, straight corridors are best served by the longer-range DUS30CS, which can detect occupants leaving any of the adjacent rooms.

In the corridor, the DUS30CS can be tilted downwards to ensure that its beam footprint does not intrude on the large meeting room at the end of the corridor.

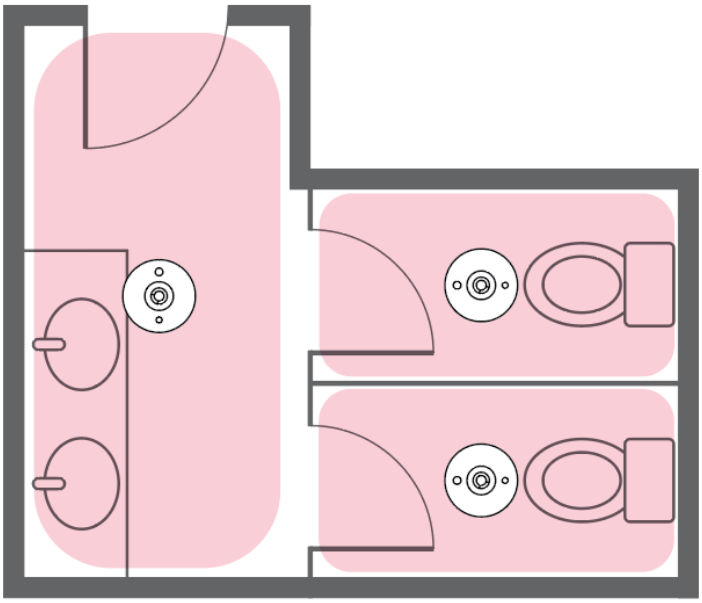
When deciding whether to leave part of a room without sensor coverage, consider the likely use cases. In the example below, the DUS90CS in the large meeting room is at the same end as the projector screen, angled down to improve nearby sensitivity where a presenter or speaker is most likely to stand and move around.

The far end of the meeting room is unlikely to be occupied when there is no other movement elsewhere in the room, so there is no specific need for sensor coverage there.

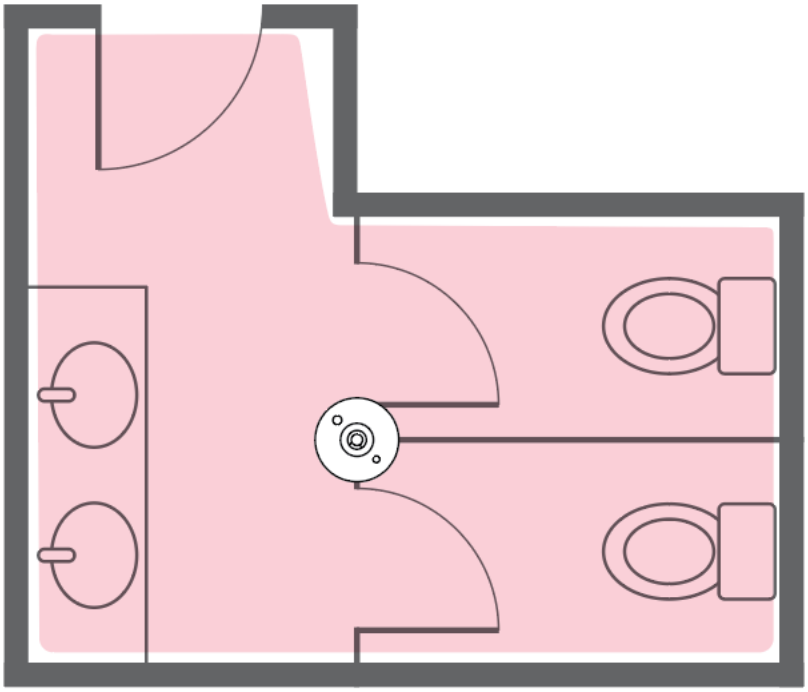


2.7 Bathroom/toilet

In a bathroom with tall or ceiling-height partitions, 360° sensors are placed over the shared area and above each toilet stall to eliminate any blind spots and ensure accurate occupancy detection at all times.



For bathrooms with lower partitions, a cleverly placed 360° sensor might be able to cover multiple areas at once.



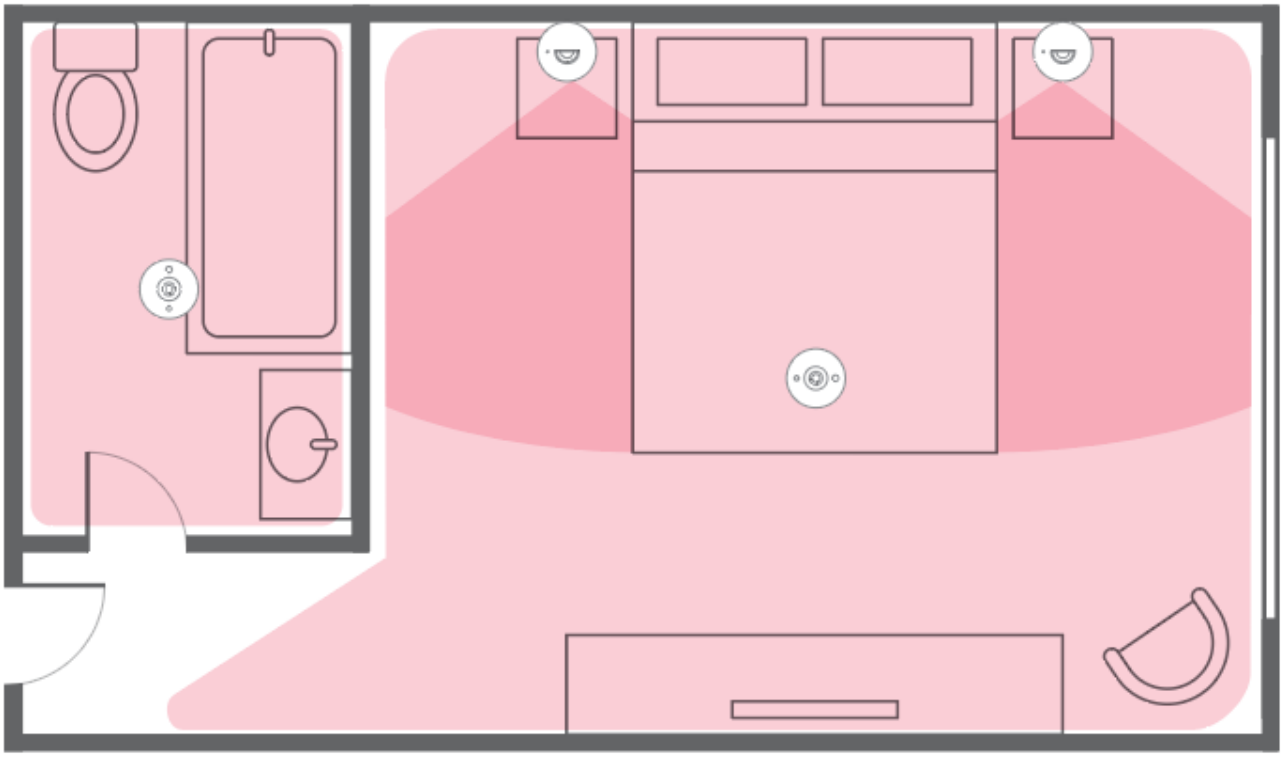
Alternatively, a single DUS804CS-UP ultrasonic sensor can provide coverage for almost any size bathroom, and is capable of detecting motion through and around most partitions and barriers. However, this sensor's extreme sensitivity may also result in false triggering from motion outside of the room. Consider your project's specific requirements before making a final selection.

2.8 Hotel Room

This typical guest suite uses 360° sensors in the bathroom and bedroom.

Larger suites might use an additional sensor in the entranceway to detect guests the moment they enter the room. In the example below however, the partial coverage provided by the bedroom sensor is sufficient.

Optional anti-stumble sensors (DUS360CR paired with the DUS180WR faceplate) are installed at ankle height on either side of the bed to detect a guest getting up in the dark. This triggers a nightlight function that gently illuminates their way to the entrance or bathroom.

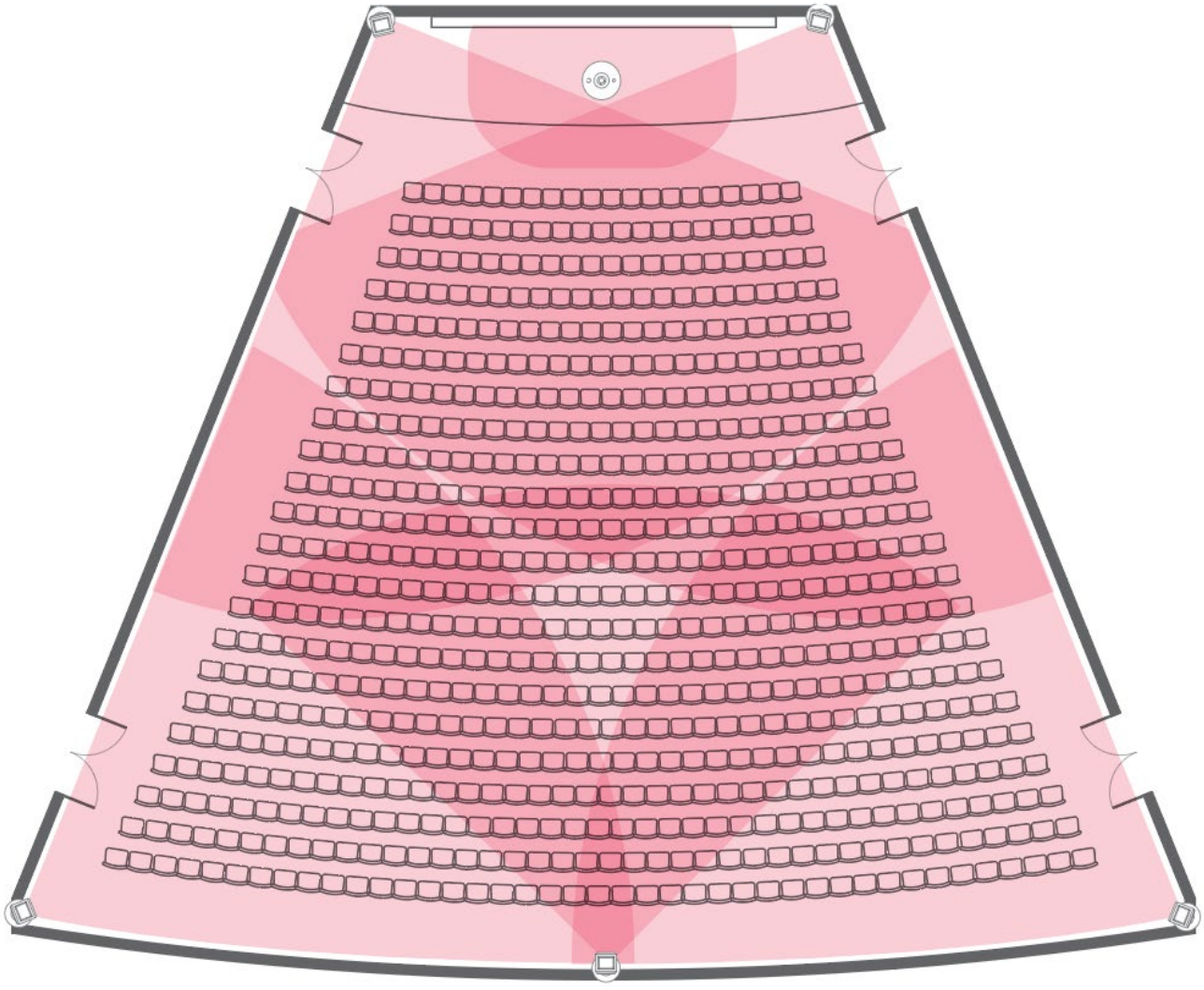


2.9 Auditorium

In this example DUS90CS sensors provide coverage of seating and foot traffic areas, while a dedicated 360° sensor ensures fine-tuned detection of any motion at center stage.

For larger spaces, more sensors can be added to the back and side walls, as well as across the stage as needed.

Smaller spaces with lower ceilings may achieve adequate coverage using only ceiling-mounted 360° sensors throughout.



The sensor layout and footprints shown here are roughly to scale, but cannot account for the unique dimensions, conditions, and requirements of your project.

When planning your optimal sensor layout, consider the most common use cases and refer to the specification sheets for each sensor model.

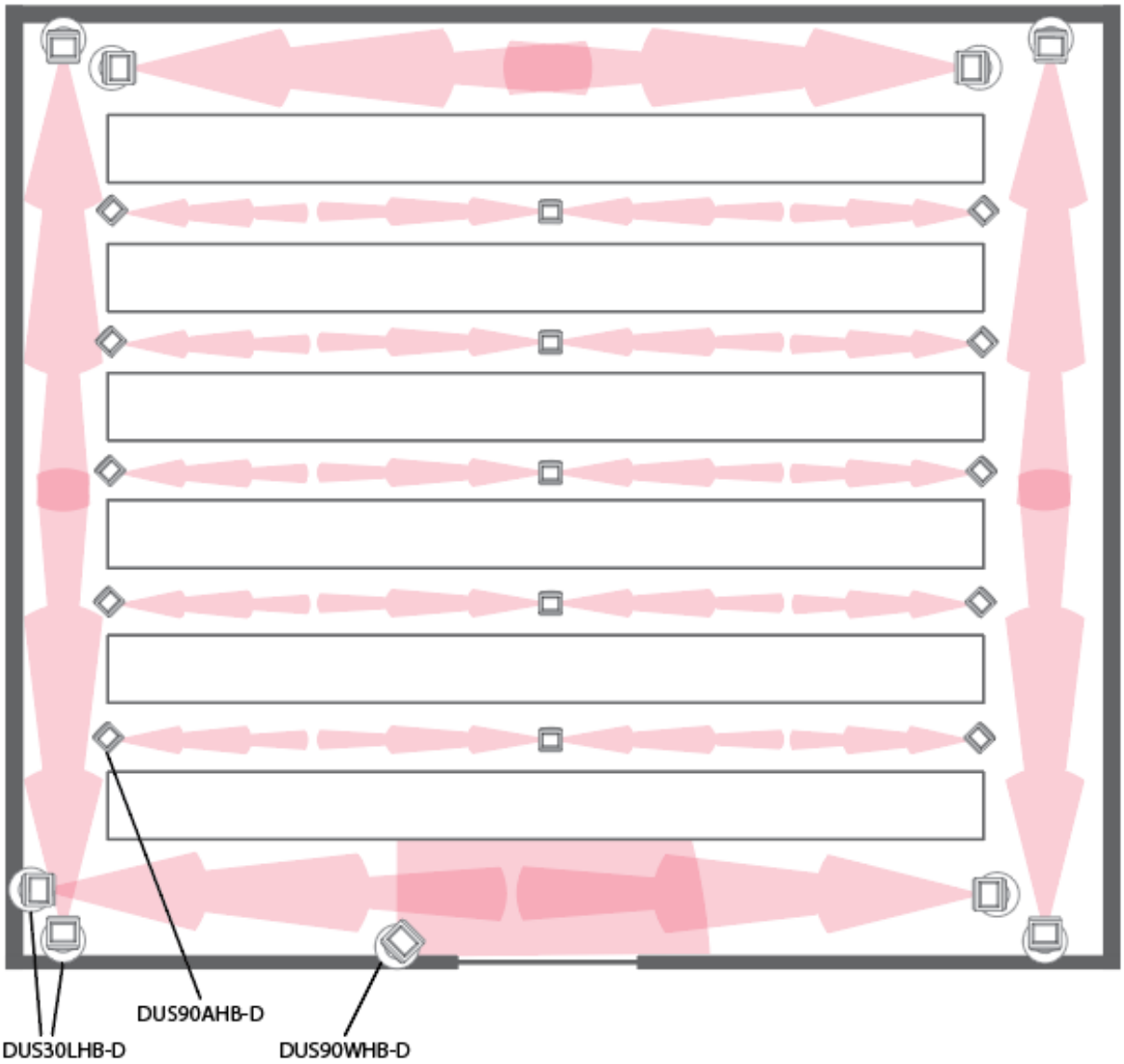
2.10 Warehouse

Warehouse spaces tend to have high ceilings with aisleways divided by tall shelving. These are best served by high bay DALI sensors paired with the DDBC120-DALI controller.

In the example below, long-range DUS30LHB-D sensors monitor the outer traffic areas, while each aisleway is served by ceiling-mounted DUS90AHB-D sensors.

An optional DUS90WHB-D can be deployed over the entrance as shown, angled downwards to ensure immediate detection of personnel or vehicles entering the warehouse.

The aisleway sensors at the end of each aisle are angled inward to focus on their assigned area and prevent nuisance triggering from motion in the adjacent traffic areas. This ensures accurate occupancy data for each area of the warehouse.



DALI capacity

Ensure that there is enough capacity on the DALI bus to accommodate your lighting, sensors, and user interfaces. The Dynalite system can easily accommodate multiple DALI universes to handle any size installation. Refer to the **DDBC120-DALI Specification Sheet** and **Installation Instructions** for more information.

2.11 Datacenter

Datacenters typically cover a huge floor area, with low ceilings and tall, narrow aisles of server racks.

While higher-ceilinged datacenters might use high bay DALI sensors, this example takes advantage of the long-range DUS30CS to detect occupancy throughout the space.

The DUS30CS can be mounted to walls, ceilings, or even to overhead cable channels. Once mounted, each sensor head can be tilted or angled to strike the perfect balance between range and sensitivity.

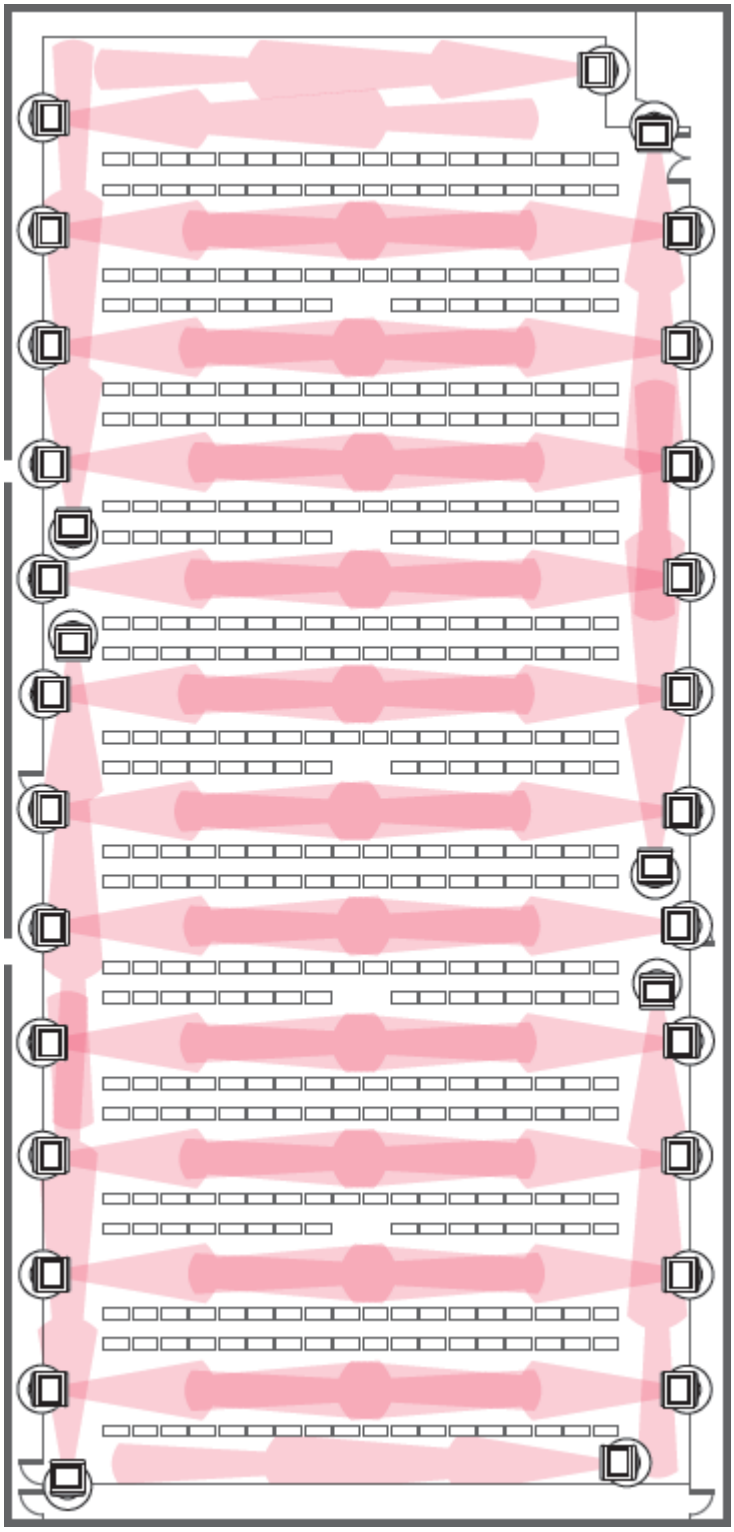
Additional 90° or 360° sensors can be included at doorways to improve detection of personnel entering the room.

DyNet Capacity

Due to the large number of sensors required for this layout, take care during planning to ensure that sufficient power is supplied to the DyNet RS-485 network.

DALI capacity

If using DALI high bay sensors, ensure that there is enough capacity on the DALI bus to accommodate your lighting, sensors, and user interfaces. The Dynalite system can easily accommodate multiple DALI universes to handle any size installation. Refer to the **DDBC120-DALI Specification Sheet** and **Installation Instructions** for more information.



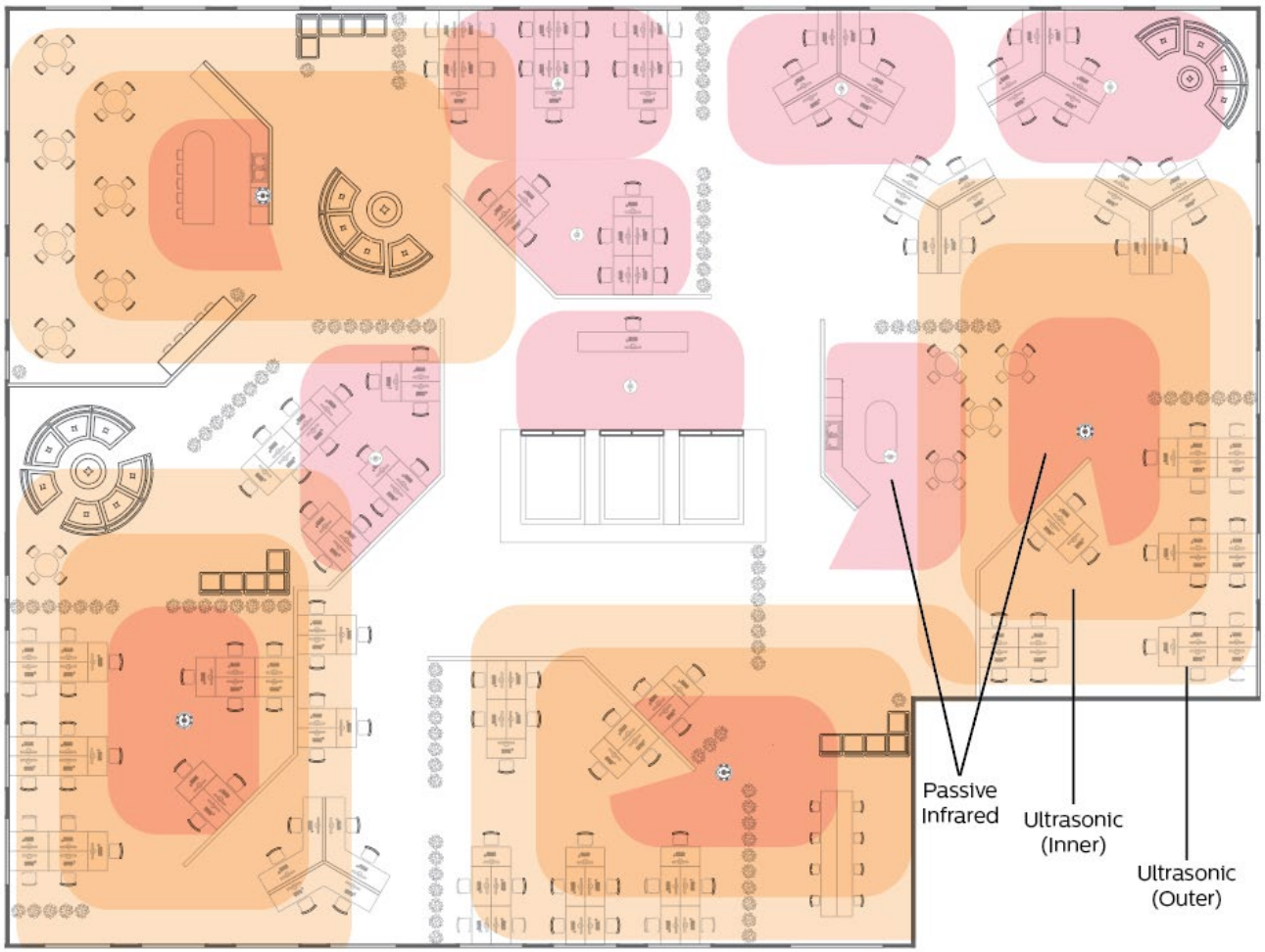
2.12 Large Open Plan Office (Ultrasonic + PIR)

This scenario shows a hybrid approach using a combination of DUS840CS-UP and 360° sensors to reduce the total number of sensors required for a large office with an irregular layout.

The DUS804CS-UP uses dual PIR and ultrasonic sensing technologies to provide a large occupancy detection footprint that works around walls, shelves, and other obstructions. Each sensor's outer ultrasonic area is sufficient to detect large movements such as foot traffic, while the inner ultrasonic area is sensitive enough to pick up much smaller movements such as nodding or hand gestures.

Because ultrasonic sensors emit an active 32 KHz signal, they must be placed at least 20m apart to avoid interference and false triggering. 360° sensors provide PIR coverage for high-priority and high-traffic areas outside of ultrasonic range, such as the elevator lobby/reception area in the center of the office, and frequently occupied desk pods.

The deployment shown here does not provide absolute wall-to-wall coverage, and leaves several low-priority areas unmonitored. These blind spots can easily be covered with additional PIR sensors as needed. As always, you should consider your project's unique requirements and likely use cases when choosing a balance between coverage, cost, and complexity.



Philips Dynalite
www.lighting.philips.com/dynalite