

## FireLaser Linear Heat Detection (LHD) provides superior protection in Amsterdam parking garage



### The Scenario

Parking garage P10 Plaza Arena is located near the Amsterdam Arena. The parking garage is spacious with an area of approximately 30,000 m<sup>2</sup> and more than 800 parking spaces. The parking garage belongs to the Plaza Arena building. This building houses companies such as Adidas-Reebok, DAS Verzekeringen, Graydon, British Telecom, ING and Cisco Systems. It is an extremely prestigious location and the client was looking for the best technology to provide a safe and effective fire protection system for the car park.

The Dutch fire regulations are among the most stringent in the world and in order to successfully pass the commissioning procedure, the system must detect a 0.25m<sup>2</sup> fire pan test at whatever is the maximum spacing defined for the site.

SenseTek is a specialist in specialist fire detection applications and worked with the customer to meet the defined requirements.



## Client Requirements

The client evaluated several systems in order to decide which technology will provide the most effective detection for the fire safety system. Because of the nature of the environment within a car park (dust, exhaust fumes etc...) beam detectors do not work very effectively and require a very high level of maintenance. The customer was therefore focussing on a Linear Heat Detection system (LHD).

The customer evaluated 2 different technologies:

1. **Copper Based LHD:** This measures the change in resistance if there is a temperature change. However, there were 2 issues with the traditional copper based LHD system:
  - a. **Sensitivity:** The system was not sensitive enough to pass the fire pan test and so could not be approved
  - b. **Environment:** Moisture in the environment caused the system to malfunction and register false alarms
2. **Fiber Optic Based LHD:** The customer evaluated different fiber optic based LHD systems and one of them was based on the FireLaser LHD system provided by Bandweaver.

In order to commission the system, the Dutch regulation NEN 2535 require that the system must detect a pan fire test of size 0.25m<sup>2</sup>. However, the customer had been advised that fiber optic LHD systems were not able to detect such a fire with an 8m cable spacing. The customer therefore had applied for a deviation to the NEN 2535 pan test and was requesting to commission with a pan of 4 times the area (1m<sup>2</sup>).

However, Sensetek was confident that the Bandweaver system would be able to pass the fire pan test according to the requirements. This opinion was based on the fast measurement time and short spatial resolution of the Bandweaver system. The FireLaser is EN54-22 approved with a 1m measurement and 5 second measurement time at ranges of 10km.

## What Did We Do?

SenseTek worked with the customer to design a full monitoring system for the car park which was based on an 8m spacing requirement. The system was designed with cable redundancy and so even if a cable is damaged, the system continues to function without interruption.

The system design is based on a FireLaser LHD system with 4 channels and a range of 5km per channel. Based on the EN54-22 approvals of the FireLaser LHD system, the system can be configured with a 5 second measurement cycle and measurements every 1m along the length.

In order to achieve the cable redundancy the system is configured in 2 separate loops, with one loop length 3900m in length and the other 3150m



## System Design

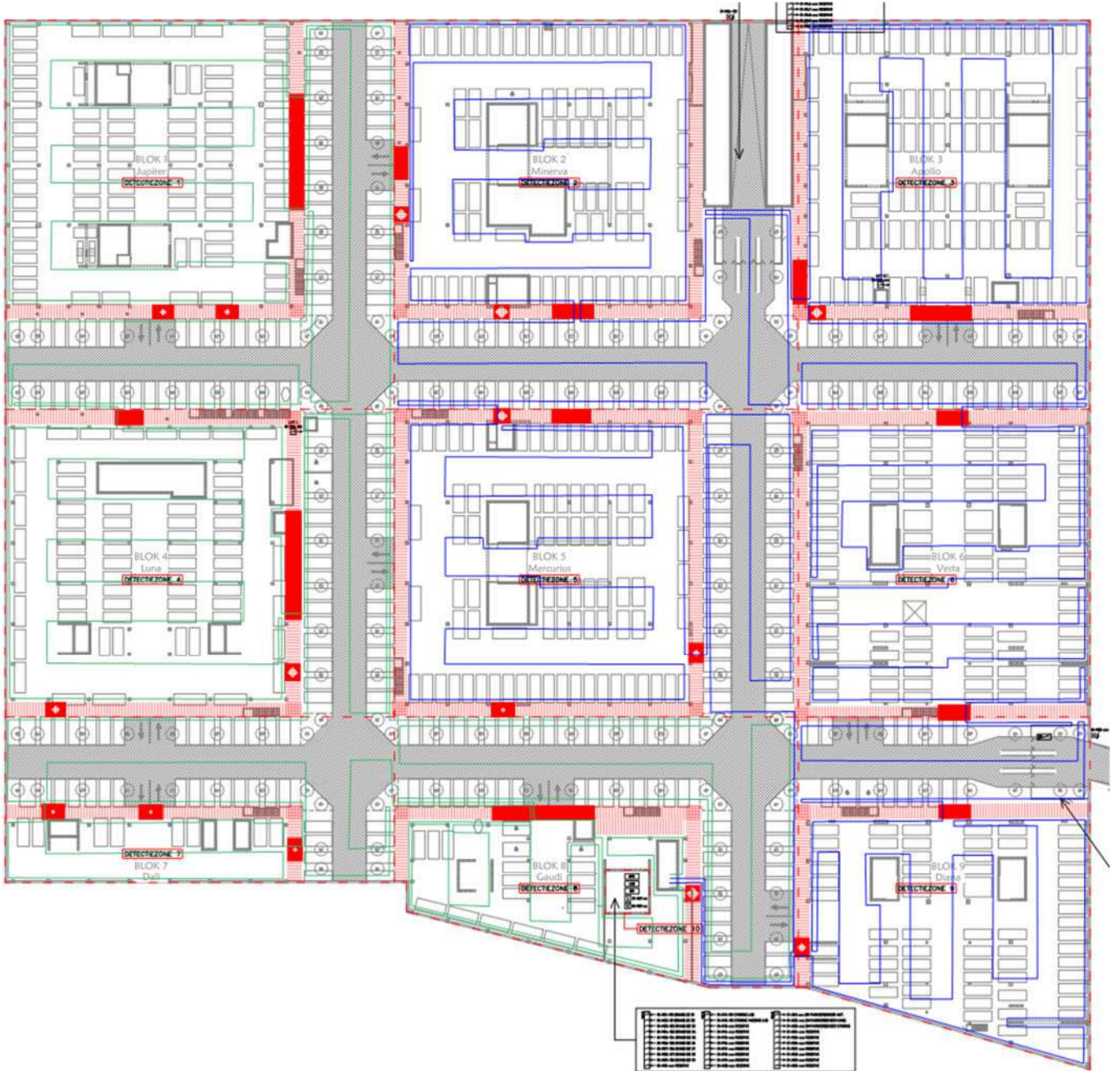


Figure 1 - Schematic showing 2 loop layout (loop 1 = green, loop 2 = blue)

## Cable Installation

The cable is installed at ceiling level with cable fixtures 50 cm apart. The car park had ceiling heights at multiple levels and surfaces. The cable is extremely flexible and easy to install, and the pictures below show some of the tight turns it needed to accommodate

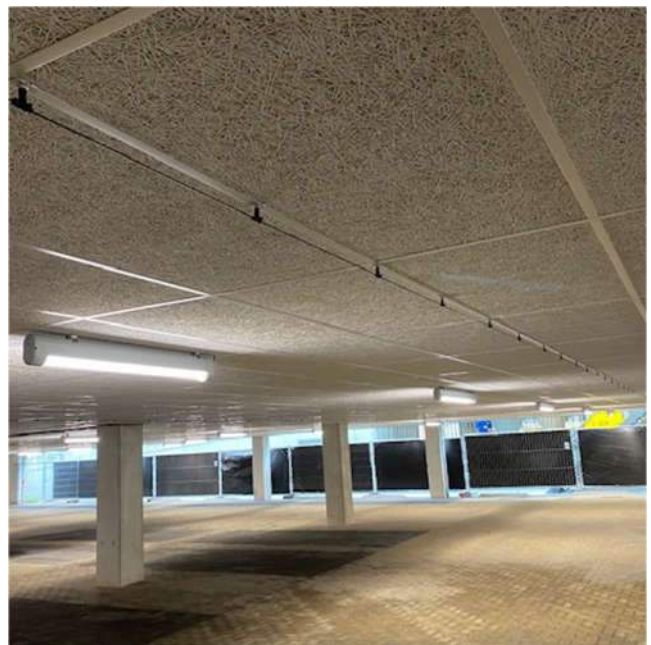


Figure 2 - Example of cable installation

## System Commissioning and Testing

According to the regulations NEN 2535 in Netherlands at the time of commissioning, the system is required to detect a pan fire of size 0.25m<sup>2</sup>. Depending on the wind speed at the time of commissioning, the pan is either filled with 1.2 or 2.4L of fuel.

The customer had trialled a number of other systems including a conventional copper based LHD system. The copper based LHD system could not detect the fire at all.

Sensetek successfully commissioned the FireLaser LHD system with no issues using the 0.25m<sup>2</sup> sized pan.



*Figure 3 - Photo of fire pan test and the FireLaser LHD system*



## Benefits To The Client

The Bandweaver system supplied by Sensetek was the only system that could meet the clients' requirements. Some of the key following benefits and advantages to the end user include.

- **Early detection of even a small fire:** Bandweaver LHD systems are approved to operate with a measurement time of 5 seconds which is considerably quicker than the alternatives. With the smart alarms (including rate or rise and deviation alarms), the system can detect fires at a very early level without risk of false alarms. This is evidenced by the fact that the FireLaser can pass the fire pan test to the strict requirements of NEN 2535.
- **Complete Coverage:** The distributed nature of the fiber optic system provides measurements every 1m along the length of the cable providing complete and continuous coverage with no blind spots or gaps in the protection.
- **Reliable and robust system:** The system was configured in a loop configuration which means that there is a level of redundancy even if the cable is damaged. Also it is not effected by any dust, particulates or moisture in the air. For example, the electrically based system is affected adversely by moisture.
- **Low Cost of Ownership:** Fiber optic cables are completely passive and have no moving parts, they are non-corrosive and immune to electromagnetic interference and typically have lifetimes in excess of 30 years and so carry a very low cost of ownership and no maintenance
- **Intrinsically safe:** The optical power within the sensing cable is too low to be able to cause ignition and so is fully certified and suitable for use in hazardous areas where explosion or combustion of combustible materials is a real risk.

## About Bandweaver Technologies

With an installed base of over 40,000km and 5,000 systems installed worldwide, Bandweaver's vision is to be the first choice for integrated distributed fiber optic sensing solutions across the globe. Since 2002, Bandweaver has been committed to delivering reliable, innovative, client-centric and value-added products and services, via a dedicated and talented team of people.

Bandweaver manufactures and distributes advanced fiber optic monitoring sensors and integrated technologies, enabling customers to monitor, secure and keep personnel and critical assets safe.

With quality and excellence as fundamental elements of Bandweaver's portfolio, the business is continuously developing its range of technologies, including Distributed Temperature Sensors (DTS), Distributed Acoustic Sensors (DAS) and integrated smart intelligent software solutions.

Utilising the latest technologies, Bandweaver provides solutions for Security, Fire, Power and Pipelines. For further information please contact our global team at [info@bandweaver.com](mailto:info@bandweaver.com)

