AP Sensing's Distributed Fiber Optic Sensing technology prevented a major accident in a manufacturing cleanroom. The early detection of the hotspot along a bus duct saved the manufacturer from significant equipment loss, downtime, and potential human injury.

The customer’s manufacturing cleanroom, which is used to produce sensitive computer touchscreens, needs to operate around the clock with high standards for air purity, humidity and temperature. Cleanrooms also need large amounts of energy for their manufacturing and environmental requirements.

Over a period of two years, AP Sensing and our local partner installed eight Linear Heat Detection (LHD) units to monitor over 30 km of high-current bus bars. These bars were installed in the bus duct system running throughout the plant.
An alarm condition was reached in the cleanroom when the temperature inside the bus duct exceeded the defined maximum for that zone. The AP Sensing asset visualization software identified the correct line, the temperature (including a history graph), and the precise location along the sensor fiber of the hotspot.

A close inspection of the hotspot revealed its cause. The joint box cover on top of the bus duct was not fastened completely. Instead there was a 5 cm gap with air, which resulted in the insulation deteriorating over a span of 12 to 18 months as the temperature continued to slowly rise.
If the overheating had not been detected by the LHD (or worse, if a worker had come into contact with the weakened hotspot), a fire or an explosion would have occurred – causing major damage to the manufacturing line, significant downtime for repairs to the line and the cleanroom, and a high risk of personal injury. It is also likely that the event would have sent a large current through the line, causing additional damage.

When the customer reviewed the circumstances that nearly led to a major accident, he estimated the potential loss to have been around $20 million. In addition, the significant downtime would have damaged his reputation.

Conclusion
AP Sensing’s LHD system performed exactly as intended for this customer in South Korea. Our Distributed Temperature Sensing (DTS) technology, based on AP Sensing’s unique code-correlation Optical Time Domain Reflectometry (OTDR), revealed the developing problem as soon as the alarm condition was met. With the addition of our intuitive asset visualization software SmartVision, the personnel could easily identify the exact location of the hotspots. Without any interruptions to the manufacturing line, the defective bus duct could be repaired. Valuable assets were protected, and business continuity was maintained.