



## Video Smoke Detection

### Common Questions

# VSD Common Questions



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VSD  
Common  
Questions



### Introduction

The purpose of this report is to answer standard questions that arise with reference to Video Smoke Detection (VSD). The questions are published in the Fire Safety Engineering journal.

### Version History

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### 1. What is VSD and how does it work?

VSD is a camera based fire detection system, which is used extensively in areas that traditionally have been challenging for fire safety professionals, such as lofty and voluminous areas. It works by accurately detecting smoke patterns by using computer analysis of video images, provided by standard CCTV images.

### 2. What type of applications are most suited to VSD, and why?

VSD is suitable for use in a variety of applications such as; but not limited to;

- Historic Buildings
- Power Generation Halls
- Large Open Areas
- Warehouses
- Atria
- Tunnels
- Cold-stores
- High Value Areas
- Telecommunications
- Production areas
- Aircraft Hangers
- Shopping Centres
- Transportation
- Petro-Chem (Onshore & Offshore)
- And other complex Commercial Applications

In the areas mentioned, conventional detectors would not be able to detect smoke effectively; this is either because of air movement, stratification or background contamination. As VSD detects the smoke at source it is therefore unaffected by the size of such areas and more importantly provides an early warning detection system which conventional detection cannot offer, as smoke has to be able to reach the device however sensitive it may be.

### 3. How does VSD differentiate between smoke, steam, and exhaust fumes or pollution?

If existing pollutants are present that are part of the normal environment, VSD will be engineered to suit by adjusting the smoke detection parameters. Engineers treat each camera view as a unique image. Over the commissioning period unwanted alarm phenomena is engineered out and smoke tests are carried out on each camera to ensure the system is detecting in all environmental conditions.

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#### 4. Why is VSD not affected by the distance between the CCTV camera and the fire?

The area that is to be protected by VSD is determined when the site survey is carried out. It is at this time that the appropriate Camera and Lens is selected. The VSD is only as good as what it can “see” and the lens designates the viewing area. Therefore it is the camera lens and line of sight that stipulates the distance between the fire and VSD cameras.

Another factor is the size and type of the fire to be detected. As a rough guide, 10% of the screen (VSD monitor) height needs smoke in it to detect. This sensitivity can be increased and decreased by programming and again choice of lens will affect this calculation.

Maybe a way of describing this is that theoretically we can detect a fire on the moon! However we would need a clear night, a 1000-foot smoke plume and a camera with a 10-foot lens!

#### 5. What are the advantages of VSD over, say, conventional smoke detectors?

The advantages of VSD are;

- It detects smoke at source giving: -
  - i. Faster speed of detection by not waiting for the smoke to reach the camera.
  - ii. Less affected by airflow movements.
  - iii. Accurate location of source.
  - iv. No concerns with stratification of smoke and thermal barriers.
- The visual verification of the event giving: -
  - i. Accurate information.
  - ii. A better structured response to the incident.
  - iii. Reduction of danger to personnel by remotely viewing the incident and not investigating.
  - iv. Faster response time as no investigation travel time to the alarm is required.
- A single camera provides a large area of protection. Additionally each camera view can be subdivided into zones that can be individually identified to divide up to reduce search areas should contacts only be used (such as would be connected to the house fire alarm panel).
- Access. The cameras can be placed on the wall “looking” over areas. This gives the opportunity to use the VSD to protect areas that cannot be easily accessed (as would be necessary to install conventional detection). This is also an advantage for installation and maintenance.
- Cost. If a large area is to be protected the VSD will work out cheaper due to the reduction in equipment needed and the installation costs. This is more evident where there are existing suitable CCTV cameras, as then there is negligible installation. Many of the VSD installations are used as a combined CCTV security and fire detection system.
- Software Based. As with all technology VSD is constantly improving. 95% of these improvements are software upgrades that can be easily uploaded on a regular basis always ensuring the system is at its optimum.

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- Remote monitoring. A video image can be seen anywhere in the World if required. Additionally on line diagnostics for planned or defect maintenance can be performed which reduces cost and time.
- Recording of events. New VSD systems are fitted with a DVR-IP (Digital Video Recorder). This will allow the operator to record and play back pre and post alarm incidents to gain extra information such as cause of incident, whether there is someone injured at the scene before the smoke blocks any views etc.

### **6. How does VSD reduce false alarms?**

As part of both the design survey and commissioning phase, areas of potential false and unwanted alarms are identified and steps are taken to eradicate these by programming. A period of on-site “soak testing” will identify any further problems that are logged by the system that are not readily evident at the time of initial set up. These can then be engineered out during the final commissioning stage and throughout the maintenance phase if necessary.

### **7. What is involved in adapting an existing CCTV security system to incorporate VSD?**

So long as the existing cameras are of the fixed type, of adequate quality and are covering the area that is deemed to be at risk; all that is required is the standard analogue video feed from each camera that requires monitoring. This can be “T-Tapped” from the back of the multiplexer unit to minimise installation works.

### **8. How easy is it to integrate a VSD system with a fire detection and alarm or building management system, and what are the cost implications?**

The VSD provides freely programmable volt free outputs; this ensures compatibility with all systems that accept an input. In this instance all cameras can have there own output/s or a summary output, this is programmed to meet the customer’s requirements. VSD will also provide fault outputs to the required system for monitoring in the same way.

The cost implications are minimal.

### **9. What operator training or other facilities are required?**

Basic operator training is required to familiarise the user with the functionality of the software.

The system has three levels of passwords for system security and training is tailored to suit the requirements.

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### 10. How does the new FireVu remote monitoring work, and can it be retrofitted to an existing VSD system?

FireVu is the latest VSD system. It works on a client / server basis in that the server is placed near to the cameras and is connected to the client PC regardless of the user's operating platform. The communication protocols are TCP/IP over LAN or WAN. An Alarm Server will distribute an event to any number of preconfigured Clients. The Client is provided with real-time MPEG4 motion video of an alarm event fed from the FireVu server.

If the added functionality of FireVu were required from an existing VSD-8 installation, the FireVu system can be exchanged at the same location without any additional installation wiring.

### 11. What will FireVu do that cannot be done by the original system?

A few of the basic improvements are as follows: -

- All of the server hardware is now bespoke. This means that it has been designed specifically for its purpose and is therefore optimised.
- The software operating platform is now embedded using a Linux base replacing DOS used on the original system.
- The FireVu servers can be distributed to increase flexibility of system layout. Each of these servers are autonomous and have volt free contacts to connect to a fire alarm system should there be a problem with the network connecting them.
- Online diagnostics are a key part of the new design. Response time to first stage defect maintenance can be rapid. Most problems can be identified quickly and are usually power or camera feed issues. This information can then be given to the operator, which will often eliminate the need for a call-out and the costs involved.
- Online maintenance can be performed on a very regular basis (even daily if necessary). D-Tec's central system can perform a comfort check to conform the system is fully operational. Additionally video images (taken during smoke tests at commissioning) can be played on line to ensure the system alarms correctly.
- On line upgrades can be performed as and when available.
- The built in fully functional DVR-IP in the FireVu server allows a number of pre and post alarm events to be held in memory as opposed to static images.
- Multiple operating (clients) machines can be connected . These can be either local or remote.

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### 12. Where has VSD been installed and what are the users' experiences?

VSD has been installed in a variety of applications around the World that can be observed from the VSD Reference List (this list is not exhaustive as many of our clients seek confidentiality due to the sensitivity of their sites). Installations are varied and include Aircraft Hangars, Turbine Halls, Tunnels (Road and Communications), Waste Recycling centres, Oil and Gas Installations (Refineries and Off-Shore Platforms), Production Plants etc. As for Users' experiences, this is best answered by the fact that we often receive repeat business from existing customers. They are both more than happy with D-Tec's commitment to provide a solution to challenging applications and the performance of these systems once installed. There are case studies and testimonials available on the website.

### 13. Will video smoke detection work in the dark such as nighttime?

The smoke detection will work at nighttime. In most instances this will require the addition of IR lighting. We generally use monochrome cameras as they operate at a lower lux level.

### 14. Is a high-resolution camera better than a low-resolution camera?

Yes high-resolution cameras are better than low-resolution cameras. We would recommend a *monochrome high-resolution camera*; we generally use the "Vista Protos Xview" which is a 580-line monochrome camera. This has the added feature of variable *peak white inversion*, a requirement when specifying a camera. This prevents the auto iris from hunting which will affect the background reference image, which is stored on the system.

### 15. Can cameras with auto panning mode be used?

A Pan, Tilt & Zoom (PTZ) camera can be used so long as the camera returns back to a fixed position for detection, this will always be the same position. An output can be fed from the PTZ camera into the system to halt detection during the PTZ movement phase. The system uses a background reference image for detection this is why the system will not detect when the camera is moving as the image reference would be affected.