Evaluation of passive and active optical imaging technology and its effectiveness in occupational hygiene practice

Brian Cressey, 2013

ABSTRACT

The aim of this research was to determine if current state of the art gas imaging technology is at a stage where it can be applied to Occupational Hygiene applications and in turn create better risk awareness of exposure scenarios.

Although the majority of the research was based around qualitative field trials, these trials did create new challenges that the instrument manufacturers had not encountered before, when they had carried out laboratory evaluations. In addition to the field trials a short questionnaire was used to determine individual’s perception of exposure and their awareness of traditional and advanced visualisation techniques.

All of the cameras were based on infrared technology but did have unique differences from each other. Three out of the four cameras were based on passive technology, whilst the fourth camera utilised active technology.

One of the passive cameras was found to be at a stage where it could be utilised now by Occupational Hygienists and Safety Practitioners with limited training. However, these particular cameras could not speciate or fully quantify the gas of interest. The other cameras clearly have future potential, particularly if they can speciate and quantify the target gas. However, they do require further research to reduce cost, complexity and improve portability.

The questionnaire highlighted a high level of awareness about early visualisation techniques, such as Tyndall lamps for particulates, however this reduced when questioned about visualising gases and vapours using gas imaging technology.

After watching a short media clip illustrating the technology all respondents believed the cameras would be a useful technique to utilise in exposure scenarios, although 60% thought the ability to quantify the gas of interest to be a necessary requirement.

When respondents were questioned if they consider this technology is at a point where it could replace traditional gas detection, 48% of the combined responses believed gas imaging is not yet at that stage, but it could be in the future and 33% consider the technology to be at a stage where it could be a useful addition to traditional gas detection.