

3M Transcript for the following interview: Ep 102 Thermal Imaging Cameras

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(R) Welcome to the 3M Science of Safety Podcast presented by 3M Australia & New Zealand Personal Safety Division. This is the podcast that is curious about the science and systems of all things Work, Health and Safety that keep workers safe and protect their health. I'm Mark Reggers, an Occupational Hygienist who likes to ask the questions. "Why?" "How?" And "Please explain." Whether you're a safety professional, Occupational Hygienist, someone with any level of WHS responsibility in the workplace, maybe you're a user of safety equipment, or maybe you're a bit of a safety nerd who finds this stuff really interesting – then this is the podcast for you.

Today. We're talking all about thermal imaging cameras with Kevin McComb. Welcome, Kevin.

(M) Thanks for having me back again, Mark.

(R) Well, you've done such a great job, all the other times we have had you in, so we couldn't not have you in again to talk about something else you know a lot about. But for those that may not have listened to our previous episodes together, who are you? Where you from and what do you do?

(M) My name is Kevin McComb. I work for 3M. I provide technical assistance for the SCBA product. The thermal imaging product and the head safety product range.

(R) Excellent. So today we're talking about thermal imaging cameras. What is a thermal imaging camera and where are they typically used in industry?

(M) Thermal image cameras are another tool in industry used to detect either heat or cold and when used by the emergency services they're used for search and rescue, firefighting, post fire clean-up where hot spots remain, for example, after bushfires. They have a number of uses outside of firefighting

these can be from detecting hot spots on circuit boards through to detecting the worn-out bearings on conveyors. So, they are very commonly used in industry, throughout Australia and throughout the world. Cameras have been used for detection of people who have elevated temperatures at airports, and obviously they are used for medical screening. We wouldn't recommend a fire-fighting camera for this. However, some cameras, which will operate in that lower range are ideal for detecting elevated temperatures.

(R) During the pandemic, we're probably all familiar with the things we saw on the news of those type of cameras being used, yes, as you say at airports or entering into buildings. But that visual guide can really help, sort of, you pick those people that may have elevated temperature, which may be something like Covid, or other sort of condition there. So, very versatile bits of equipment when you think about all the applications you've spoken about.

(M) Yes, some cameras even have what we call hot spot and cold spot detection on them. And that basically means that an arrow on the camera or a cross on the screen zeroes in on the hottest spot and on the coldest spot in the room. So, you can imagine when we're talking about a crowd of people, we need to detect a person who is running a lot hotter than the rest. Then this sort of technology is used.

(R) I know it's a very visual thing we're trying to describe here. But what comes to mind when I think of thermal imaging cameras is a handheld-type device, and it's got a little screen. It has lots of reds and yellows to show the warmer spots. Is that correct? Is that sort of the right image we should be setting the scene there?

(M) Yes, Mark, the best way to describe it, it's like a large torch-type instrument, which we point at the direction of where we want to be looking, for example, through smoke and yes, there's a screen. Basically, it allows us to see through smoke and detect images, which are translated from their heat signatures.

(R) I know part of my previous life pre-3M I used to do mould assessments. And so, a thermal imaging camera was a device that was used to help in that investigation. It's not detecting mould, but we've seen some of the temperature differences and may lead you towards maybe more moisture, maybe a bit cooler than not. So, there are a wide range of industries and applications that these things are

actually used, that you may not typically think off straight away. But how does a thermal imaging camera actually work to give us that heat map?

(M) Our eyes see by seeing contrast between objects, that are illuminated by either the sun or another form of light. All objects, living or not, have heat energy. Infrared cameras are used to detect this. Heat energy given off by an object will display onto a screen and the hotter the object, the more heat energy is given off and that's translated, obviously, to an image on the screen. That's why thermal imaging cameras can operate at all times, even in complete darkness or in a smoke-filled room.

(R) Is there a temperature range, like there's a maximum and minimum that these things operate between?

(M) This would depend on the application. There are some cameras are used in airports to detect passengers with an elevated temperature, for example, while some cameras are used to detect high temperatures and fires. So, we normally say that cameras can operate from, say, minus 20 up into a range of over 650 degrees Celsius and some other brands can operate up to 1000 degrees Celsius.

(R) Wow, so it really does depend on where that application is and to what those maximum temperatures are, by the sounds of it.

(M) Yes, most definitely, the range will suit the needs. So, as you mentioned, we don't necessarily need a camera that can detect 600 degrees when you're looking for mould in a house.

(R) So, some of these devices are pretty smart from the technology that's in there. Can you also do video records. If you're doing an investigation from an emergency service point of view, can that record that the future use?

(M) Entry level cameras are unlikely to have video recording devices built into them. However, we're seeing more and more cameras being fitted with video capture. So, as technology improves, we're finding more cameras will have that. But don't count on the camera having a video capture device.

(R) So, if it is something that you do need, do check the model that you're looking at, or the brand, or the style and see that it has those features that you are after.

(M) Most definitely, as I mentioned, we may not need video capture. For example, if we're looking for a hot spot after a bushfire on the ground, we need a very basic camera. So, a video camera is not necessary. We don't necessarily need evidential video for something like that and that obviously reflects in the price of the camera.

(R) So, you mentioned a couple of features, but if I was a workplace or emergency service looking to purchase the thermal imaging camera or considering it, what are some other things they should be thinking about?

(M) I think the most important one is dynamic range. The maximum temperature a camera can see before what we call 'saturation' occurs. That means that the screen basically whites out. So, this shouldn't be confused what ambient temperature a camera can be used in. And most competitive cameras will have a dynamic range of 600 degrees or less. So, dynamic range is really important because in a fire, when a flashover occurs - that's when the superheated area is actually happening in the top of a room, the temperatures can exceed 600 degrees - and having the extra headroom allows users to find a way out of these extreme conditions.

(R) What about weight? How heavy these things, typically?

(M) Mark. They're getting lighter by the year, there's no doubt about that. We'd be talking in the one to two kilo range.

(R) How small can these thermal imaging cameras get? When I think of firefighters and other emergency services going into a situation, they're going to have a bit of gear they've got to carry with them. How small can they get? How portable are they becoming?

(M) Minaturised cameras are now becoming more common, and it can be incorporated to the SCBA themselves. Some cameras are mounted on the firefighter's face-piece or may be incorporated into the pressure indicator. To give you an idea, the small screen on the Scott camera basically is about a

centimetre square and is mounted inside the visor. So, it's a small screen, but close to the eye, it can be seen very easily.

(R) And in those situations, you want to be able to quickly look and see the temperatures or how hot something may be. So that's probably all you're going to need in that on-the-job application in the real-world type of environment, there.

(M) Most definitely.

(R) Kevin, how durable are these types of devices, or how durable do they need to be? Because they're going to get used in a whole range of different heavy-duty, rough environments.

(M) Mark, obviously, with firefighting cameras, unlike scientific instruments, we need to be looking at what we call Ingress Protection (IP). So, this is all about the durability of the camera, whether it can sustain contact with water, whether it is able to be dropped from a height, and we need to understand that these things need to be built rugged as well, because they're being used in a rugged environment. So, that's also available on the manufacturers' websites. Look at the IP ratings. Look at what other testing the camera has had. The camera may perform very well, but we need to know that is durable as well because it is at times going to a harsh environment.

(R) Ingress Protection ratings is a common thing that workplaces may have seen a whole range of different devices. I know when I first came across it when I used to be involved with gas detection devices, where the IP test puts them through dust testing and different levels of water, so drips and sprays and splashes and jets of water. So, the higher the IP rating the more durable it's going to be and dusty or wet environments as well. So, important to consider, as you say, especially in those emergency service environments. These are going to get put through some fairly rough and ready situations there.

(M) Most definitely.

(R) So with these devices - like other things were spoken about, especially the self-contained breathing apparatus (SCBA) - do these things need to be calibrated at set time periods? Are there specific maintenance requirements, people should be aware of?

(M) The cameras require very little maintenance. However, due to the nature of the application, we're talking about firefighting cameras they do get damaged from time to time and require repair. Mark, the most likely thing that users will have to replace is batteries.

(R) So, like any bit of equipment, providing that it's being looked after, you should get a pretty good life out of these bits of equipment then.

(M) Yes.

(R) So, these are very specialized devices and very specific applications. But to sum thermal imaging cameras up for people that weren't aware of the range of applications that can be used and some of the features, say, combined with self-contained breathing apparatus mask. What would you want to leave with our listeners today?

(M) I think purchase a camera that suits your needs. We talked about video capture, not video capture. We talked about temperature ranges. So, for example, why would you buy a firefighting camera for an industrial use or try and use the industrial camera for firefighting? Definitely buy the camera that suits your needs. Yes, thermal cameras work well in the hands of trained firefighters. They enhance fire safety and when used correctly, assist with search and rescue as well as early detection of fires. But, buy the camera that suits your needs.

(R) Like anything, as we talk a lot about on this podcast; application, application, application. That is going to put you down a certain pathway with the type of products and type of training that is required. If listeners want more information about thermal imaging cameras, any good places you could direct them to?

(M) Like anything else, the best source of information these days is on the web. And through manufacturers' websites and articles about the technology.

(R) No worries. So, certainly, check out the 3M website for information on the 3M range of thermal imaging cameras. And for those listeners that would like to get in contact with yourself, or they've got some specific application questions. What would be the best way to do that?

(M) Feel free to contact me through LinkedIn.

(R) Excellent, so search Kevin McComb, but you're also welcome to email the podcast email address - I usually say at the end there - and we'll get you in contact with Kevin. Thank you so much for coming in again, Kevin. Really appreciated your time there.

(M) Thanks Mark. My pleasure.

(R) Well, thanks for listening, Everyone. You can get in contact with a show by sending an email to ScienceofSafetyANZ@mmm.com if you have any questions, topic suggestions or would like some assistance in your workplace when it comes to thermal imaging cameras or any other type of PPE, 3M are certainly here to help. You can also visit our website <https://3m.com.au/sospodcast> for further resources on thermal imaging cameras, as well as a transcript of the chat Kevin and I have just had. It also has information on all the other previous episodes we have recorded. Be sure to subscribe, rate, review and share through Apple Podcast, Spotify, Google Podcast or wherever you get this podcast from.

Well thanks for listening everyone. I have some bittersweet news I want to let all our amazing listeners know about. this will be our last episode as we are wrapping up the Science of Safety Podcast for now. We launched the podcast in August 2018 not knowing how many episodes or how long we would do it for. It has been nearly 3 years ago and 102 episodes later which is crazy to think. The amount of positive feedback we have received from across the globe has been humbling. Especially the feedback where the information covered from our range of expert guests has help trigger a change in a workplace to improve the safety and health outcomes for workers. Also hearing from students getting started in Workplace Health & Safety who have found the episodes helpful being introduced to a new subject area is also encouraging for me to hear. It has been such an amazing experience and personally very satisfying.

All the episode will still be available to download and listen to at any time if you want to go back and re-listen any episode. just search Apple podcasts, Spotify, Google podcasts or visit www.3m.com.au/sospodcast to check these out including this episode with Kevin on Thermal Imaging Cameras.

As much as you heard me and the various guests over the past 3 years, the science of safety podcast wouldn't have come into existence and continue for all these years without the hard work from an amazing group of people. I wanted to quickly thanks Sarah, Sam, Leo, Nim, Sathiesh, Jacob and Rachael from 3M. But also a huge thanks to Stefan from Cyrius Media group who did all the audio editing and producing to make me sound good and edit out all my stumbles.

But lastly the biggest thanks goes to all the listeners and subscribers who supported us since our launch.

You can still get in contact with myself via LinkedIn or send me an email at mreggers@mmm.com.

And as Ralph Waldo Emerson said, “the only person you were destined to become is the person you decide to be.” Thanks for listening and have a safe day