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Considerations When Specifying & Sourcing Infrared Cameras

By Jeff Noon, Regional Sales Manager, Livingston

Infrared thermal imaging cameras can be utilised as analysis tools in all manner of applications; industrial processes, predictive maintenance, verification of electrical/electronic thermal modelling, data centre energy optimisation, and scientific research to name but a few applications. When looking to work with such sophisticated pieces of equipment there are many different issues that should be deliberated over before making a decision about which product to pick, and how best to source it. The following article looks at what needs to be reflected on when determining this.

Ensure the camera gives accurate and repeatable results

A fundamental requirement of any infrared camera will be to produce accurate and repeatable results. An advised accuracy standard of $\pm 2\%$ should be adhered to. The prospective user should also have a basic understanding of matters such as emissivity and reflected temperature in order to uphold the integrity of the data they acquire.

Detector resolution and image quality issues

As with a digital camera, the more pixels an infrared camera has, the better the resolution and the sharper the thermal image produced will be. The pixel resolution of the infrared detector and the camera's display must be differentiated between though. If told that a particular camera has 640 x 480 resolution, it is vital to confirm whether this refers to the resolution of the detector or the display. It is the detector resolution and detector pixel count that give the true resolution of the camera. In principal the display could have a very high resolution, but if the detector didn't match this then it would be of no actual benefit.

Ensure the camera has a wide temperature range

When specifying an infrared camera, it is vital that the temperature range it operates in is sufficient to cover the thermal spectrum of what is being analysed. If this is not the case, the analysis undertaken will not be fully effective.

Specify a lightweight, ergonomic design

Whatever the application, weight is likely to be a concern. A camera weighing just a kilogram more than another will start to cause back and arm strain within just 20 minutes of use. Finding the most lightweight model that delivers the required functionality is key, especially if used frequently or for extended periods. Also, the more compact and ergonomic the camera is, the more likely it will be able to be hung from a work belt, to give the user hands-free control when needed.

User interface implementation

The way the camera's user interface is set out is also critical. Though it might seem counter-intuitive, it is often the case that an extra button or larger/more populated keypad will actually make the camera easier to use, as opposed to trying to do the same functions with less buttons. Some infrared cameras even have integrated onscreen buttons or touchscreens. Though these may have a slightly higher cost associated with them, the added functionality could warrant this if it allows tasks to be carried out more quickly and efficiently. The on-camera buttons should also be very comfortable to use, but more importantly, intuitive to understand what function each delivers. The prospective user should be walked through the various activities they will be performing (saving an image, downloading it to a PC, creating a simple report, etc). The user will thus have firsthand knowledge of how many steps it will take to complete a specific task, and ensure that simple operations are not in fact be buried deep within difficult-to-use menus.

Ensure it is easy to change the camera's battery

This is one of the most important aspects of usability for an infrared camera. When using a camera to investigate an electrical problem, or to inspect important assets such as the production lines in a manufacturing facility, if the camera loses power the user could potentially be left exposed to serious safety risks. It is important to specify an infrared camera that supports pop-in/pop-out battery replacement, so that it can be changed quickly and easily. The user should also ensure that an extra battery and a battery charging station have been provided. The battery technology employed should be enquired into too. Batteries that are based on Lithium Ion technology will have a longer lifespan than previous battery generations, allowing the user to work for greater periods between replacements. Some manufacturers offer car/truck chargers so the battery can be charged up while in transit.

Specify a camera that outputs standard JPEGs

It is not to choose an infrared camera that requires additional software to convert thermal images into a standard jpeg format. Standard JPEGs are far easier to email or incorporate into Microsoft desktop applications. Enquiries should be made if the JPEGs produced are standard or if they first have to be run through the manufacturers' proprietary conversion software.

Ensure the infrared camera incorporates a high resolution visual camera

The addition of a built-in Megapixel visual camera with integrated illuminator lamp will greatly assist the user in clearly documenting their work. This will reduce the risk of errors occurring, that could mean work has to be undertaken again or potentially have even more serious implications.

Specify a camera with a built-in laser pointer

Laser pointers can prove very useful, enabling the operator to keep their hands away from potential harm while pinpointing areas of concern to co-workers/supervisors/customers. This allows more than one person to concentrate on the problem in front of them. Laser pointers also help users to orient themselves in relation to the target, and mitigate any confusion over what exactly their camera is looking at.

Choose a camera with enhanced image fusion capabilities

It is important to ensure that basic image manipulation is supported, such as being able to move the 'thermal box' around, or make it bigger/smaller. More advanced fusion capabilities allow stretching and resizing of the thermal Picture-in-Picture (PiP) using a stylus pen onscreen. This enables customization of the fusion to the exact target being looked at,

improving the level of analysis carried out. Advanced infrared cameras now permit the combination of visible and thermal imaging into one composite image.

Financial considerations

Infrared cameras can be highly expensive - models required for certain high end applications can have values of £30,000 or more. The current climate means that business capital is scarce. By taking an approach based on the lease or rental of infrared imaging equipment, instead of buying it in, expenditure can be matched more closely with peaks and troughs in demand. Additional equipment can be made available when needed, but likewise there is no risk of having excess stock which is underutilised. The scalability offered by a rental approach means any sudden surge in activity can be taken care of. Also, as is often the case, if a specific project calls for an infrared camera for just a short period, then this is a far more cost-effective solution. Furthermore, as rental is an operational expense rather than a capital one, and is off the balance sheet, it is fully tax deductible.

Protect against hidden costs

The total cost of ownership for items such as infrared cameras is not always fully appreciated. Insurance, maintenance, storage, recalibration, security, transportation between sites, and a variety of administration costs need to be taken into account. By leasing/renting these items instead of purchasing, all of the costs are passed on the rental partner to deal with. Downtime is another concern and can be an expense that is often overlooked. If a camera is damaged, then sufficient cover needs to be available while it is being repaired. With leased/rented equipment it will be replaced quickly, minimising disruption and safeguarding against any loss of business. One more hidden cost, particularly as government regulations become increasingly stringent, is the item's eventual disposal. This is something that does not have to be worried about when following a rental strategy. There aren't any depreciation or obsolescence risks involved, as the items are just rented for as long as they are needed, after that they no longer represent any financial burden.

Make certain the camera has a well defined upgrade path

Requirements can change with time. Often users purchase an infrared camera, then find after only a few months the level of functionality they require is actually greater than the purchased model can offer. By engaging with a rental partner it is possible to try out camera equipment before committing to it. A short-term rent means the prospective user can ensure a particular model fully meets the requirements set by their application. Plus if after time these requirements change, then the option to upgrade is always there. It is thus possible to benefit from the technological advances being offered by new generations of cameras, while not making a dent into financial reserves, or being left with redundant camera hardware sourced previously.

If a new market requires access to a specific high value camera type, it may be a barrier to entry. Renting circumvents this, so new business opportunities can be explored without having to make heavy upfront investment.

Ensure adequate technical support and training is provided

The customer service, training and technical support that can be called upon are major factors to be taken into account. Engaging with a supplier (whether this is the manufacturer or a rental partner) who can deal with these matters will be advantageous in the long term.

In conclusion, making the right decision to ensure the correct infrared camera is specified and supplied is dependent on many different variables, and should not be done without addressing all of these fully. Thought should be put into what is required for the specific application, whether inclusion of certain features can be justified by increased operational efficiency, whether changes in technical requirements can be satisfied, how the sourcing of the camera will be funded, and whether renting or purchasing it will be most favourable.

About Livingston:

Livingston provides and manages test equipment for companies in more than 100 countries worldwide, giving them access to leading edge products regardless of their budget constraints. Founded over forty years ago, the company has built up a highly experienced team of engineering and supply chain professionals. Its services include rental, calibration management, and inventory management. Partnering with Livingston allows companies to optimise their capital expenditure, bringing greater return on investment, as well as generating cash for unused or underused assets through its equipment disposal and redeployment activities.

For more information visit:

www.livingston.co.uk

Contact Livingston:

Livingston House, 2 Queens Road, Teddington, Middlesex, TW11 0LB, UK.

Tel: +44 (0) 208 614 4006 Fax: +44 (0) 20 8977 6431

For full list of international sales offices [click here](#)

info@livingston.co.uk

Editorial Contact:

Kathryn Williams, Marketing Director, Livingston

Email: kathryn.williams@livingston.co.uk

Issued by:

Mike Green

Pinnacle Marketing Communications Ltd,

Prosperity House, Dawlish Drive, Pinner, Middlesex, HA5 5LN, UK.

Tel: +44 (0) 20 8429 6543

Email: m.green@pinnaclemarcom.com

www.pinnacle-marketing.com