



### **The use of Thermal Imaging in Medical and Veterinary Applications**

Healthcare is not only about treating disease and injury; it is also about protection, detection and prevention. In recent years there has been a rapid growth in the medical thermal imaging industry to monitor the sick, elderly, disabled and otherwise at risk person without physical contact and without intruding on his or her privacy. The same thermal imaging technology is now used by the Veterinarian to detect problems in animals prior to the development of complications and more serious injury.

### **Thermography**

Infrared thermography is one of the most important sensing technologies to be applied to the detection and monitoring of manufacturing and production equipment. Until recently, this sophisticated technology was prohibitively expensive, being driven primarily by military applications; over the last few years, however, the technology has improved and it has been introduced to high volume commercial and professional applications by innovative companies such as Wahl. This has brought the price down to a level which is opening up a host of new applications.

Thermal imagers measure the infrared energy emitted by surfaces remotely and are consequently extremely simple to operate as no physical contact is necessary. Many facilities have employed thermographers to carry out inspections every 6 or 12 months; the cost of the equipment and its ease of use mean that these inspections can now be carried out as and when required by the organizations own maintenance staff. Appropriate thermal imagers no longer need to cost \$45,000 or more; for example the comprehensive range of imagers from Wahl starts from less than \$2,500 – less than the cost of a single survey from a thermographer. It is the affordability of the current generation of imagers that make them eminently suitable for the Medical and Veterinarian purposes.

### **Medical Applications**

Thermography is non invasive, non contact equipment that uses the heat from a body to aid in making diagnoses of a number of healthcare conditions. It is completely safe and uses no radiation. Although operating in real time, the imagers are able to store many images which can be retrieved for subsequent analysis. Imagers are in use in hospitals, medical centers, surgeries and by individual practitioners including physiotherapists. The main categories of current applications are:-

#### **Breast pathology**

The use of the thermal imager as a screening tool in the detection of breast cancer was a controversial topic when first introduced due to the environmental control requirements; it has now gained scientific acceptance however, and is proving to be a powerful tool in the battle against cancer and other diseases.

#### **Musculoskeletal problems**

Thermal Imaging can be used to diagnose a variety of disorders associated with neck, back and the limbs.

### **Circulation problems**

Thermal imaging may help in the detection of the presence of deep vein thromboses and other circulatory disorders in the lower limbs.

There is a rapidly increasing list of other applications in the medical and dentistry fields, such as the detection of nerve damage, differentiation of headaches and dental decay to name a few.

### **Veterinary Applications**

In as much as the measurement of surface temperature of an animal indicates where there is an abnormality and therefore shows where to investigate further, thermal imaging has proved to be an invaluable tool in diagnosis and also in determining the effectiveness of treatment; in the case of racehorses, for example, the efficiency of the training program can be monitored.

Primarily used for the treatment of horses, (for diagnosis of tendon, hoof and saddle problems etc.), thermal imaging equipment is now being applied to a wider range of animals and applications. One reason for the growing popularity of the technique when applied to animals is the inability of the animal to communicate with the care taker. Radiometric thermal imaging is often used to complement x-ray and other traditional techniques in contributing to the medical diagnosis; this is being applied to a number of commercial, domestic and zoo based animals.

An earlier difficulty associated with the use of thermal imaging in medical applications was due to both the cost of the equipment, its use and understanding of the technology. This problem is now resolved with Wahl's lower cost cameras, easier to use instruments, and better training resources available.