nhbs BUYER'S GUIDE

Highlighting the very best conservation equipment

THERMAL IMAGING

PIXFRA Mile M20 Thermal Imaging Monocular

Pulsar Axion 2 LRF XQ35 Pro Thermal Imaging Monocular

Pulsar Merger LRF XP50 Thermal Imaging Binoculars

INTRODUCTION

Thermal imaging is emerging to be a favourable way to supplement wildlife surveys and monitoring. The infrared energy (heat) emitted by warm-blooded animals is used to create a distinct thermal image, which then helps you to visibly detect their location. Because of this, thermal imaging is particularly useful for surveying nocturnal or elusive species.

Thermal imaging is a great addition to the success of bat surveys; it can identify roost access points more accurately and provide images with sufficient quality to detect bats in flight. Thermal imaging is also increasingly used for other wildlife surveys. For example, it has been used for improving bird ringing programmes for species such as Dotterel and Common Quail, as well as monitoring and observing the use of Pine Marten nest boxes without disturbing the inhabitants.

As with any survey method, there are benefits and drawbacks to thermal imaging. An advantage of thermal imaging is that it is non-invasive and minimises disturbance when compared to other survey techniques. It can also fill data gaps and provide more accurate data on night-time wildlife activity and behaviour, and unlike night-vision devices, thermal imaging scopes can be used in both daylight and in the dark. Some thermal imaging devices, however, can fail in locations with thick vegetation and in extreme weather conditions, and at times it is not always possible to correctly ID species. The more advanced devices (with higher specifications) that help counteract these drawbacks are often more expensive. Despite this, thermal imaging is growing in popularity with both naturalists and ecologists.

To view our full range of thermal imaging devices, visit **www.nhbs.com**

KEY FEATURES

Thermal imaging devices can range in technical specifications. Below we identify and discuss some of the key terminology used in their descriptions.

Maximum detection range: This is the furthest distance that a thermal imaging device can detect an object, although this does not necessarily mean details or characteristics will be detected.

Detector resolution: The detector resolution is how clear the image is. The higher the number of pixels, the sharper the image.

Pixel pitch: This is the distance between the centre of two pixels on the sensor (measured in micrometres µm) – the smaller the pitch, the higher the density of pixels and the more detail.

Thermal sensitivity: This is the **Noise Equivalent Temperature Difference (NETD)**. In layman's terms, NETD indicates the minimum temperature difference you can see with the thermal device – the lower the NETD, the better the thermal sensitivity.

> *How this works:* A higher resolution allows smaller animals to be detected at a greater distance – a thermal imaging device with a resolution of 640 × 480 (pixels) can have a detection range of 1800m, and a smaller pixel pitch (12/17µm) means a higher density of pixels and a greater number of measurable temperature points, therefore producing an image with greater detail. Additionally, a high thermal sensitivity (for example <25mk NETD) detects more minimal differences in temperature and produces a higher quality image.
>
> *Note:* sensors with a pixel pitch of 17µm can achieve NETD <25mK and a pixel pitch of 12µm can achieve NETD <40mK.

Zoom: This enlarges the image by cropping and enlarging the centre frame. This does not improve the image resolution, but increased zoom can help you to count larger animals more accurately.

Refresh rate: This is how often the screen is updated with a new image. It is recommended that a higher refresh rate should be used for faster moving animals as this reduces the chance of animals being missed.

> *Example:* Bats in flight are fast moving, and so a refresh rate of 30Hz is the minimum suitable for bat surveys. Ideally it should be 50Hz or greater.

Field of view and lenses: Field of view is the maximum area that the thermal imaging device can capture, noted as the horizontal by vertical angle of view. Some devices have additional lenses that can be added (wide or narrow) to change the field of view.

> *Example:* For bat emergence surveys, narrow-angle lenses are preferable for surveying from a distance (such as roosts in trees), whereas wide-angle lenses are preferred for surveying structures that are closer (such as buildings).

Operating temperature range: This is the temperature range the device can detect for both the background and the target object. The higher the operating temperature range, the more suitable the device is for extreme environmental conditions.

Laser rangefinder: Some devices come with a built-in precision rangefinder which provides error-free distance measurements.

Other features

- **Video recording capacity:** Beneficial for reviewing footage at a later date.
- **Waterproofing:** Each device has an International Protection rating – the level of protection against external factors such as water and dust.
- **Dropping range:** Devices usually have a dropping range of 1m.
- **WiFi enabled:** Helpful for reviewing and analysing data.
- **Device dimensions and weight:** Useability
- **Battery life:** Usually a minimum of 8 hours, rechargeable batteries are available.
- **Colour palettes and scene modes:** Beneficial for different environmental conditions.
- **Cooled or uncooled:** Uncooled devices operate at ambient temperatures, whereas cooled operate in extreme low temperatures.

DEVICE APPLICATIONS

Naturalists

Some thermal imaging devices have low specifications and for this reason they are not suitable for professional wildlife surveys. These devices tend to be more affordable and are suitable for general wildlife watching.

Guide TD210 Thermal Imaging Monocular

Pulsar Axion XM30F Thermal Imaging Monocular

Ecological and wildlife surveys

Thermal imaging devices that are used to aid ecological surveys must have the specifications that allow them to collate accurate and reliable data. For example, thermal imaging devices with high specifications are suitable for bat surveys – the higher quality images and better refresh rate will improve the detection rate and mean a lower chance of bats being missed.

Mid-range devices: These are a level up from the naturalist options, although are still popular with beginners! They are ideal for those on a lower budget and have been used to supplement wildlife monitoring and bird ringing programmes.

Pulsar Axion 2 LRF XQ35 Pro Thermal Imaging Monocular

Advanced devices: Due to their high specifications, advanced devices produce more accurate detail and higher quality images. This makes them suitable for use as a survey aid for professional and ecological wildlife surveys.

Pulsar Merger LRF XP50 Thermal Imaging Binoculars

Pulsar Telos XP50 Thermal Imaging Monocular

SPECIFICATION COMPARISON

Specification	Guide TD210	Pulsar Axion 2 XQ35 Pro	Pulsar Merger LRF XP50
Device	Monocular	Monocular	Binoculars
Maximum detection range	1000m	1300m	1800m
Sensor resolution (pixels and pixel pitch)	256 × 192 @ 12µm	384 × 288 @ 17µm	640 × 480 @ 17µm
Thermal sensitivity	<50mK NETD	<25mK NETD	<25mK NETD
Refresh rate	25Hz	50Hz	50Hz
Zoom	1×, 2×	2×–8× (2× step or continuous)	2×–8× (2× step or continuous)
Field of view (H x V)	17.5° × 13.1°	10.7° × 8°	12.4° × 9.3°
Video recording capacity	Yes	Yes	Yes
Operating temp range	-10°C–+50°C	-25°C–+40°C	-25°C–+50°C
Waterproofing	IP66	IPX7	IPX7
WiFi enabled	Yes	Yes (2.4GHz and 5G)	Yes (2.4GHz and 5G)
Battery life	8 hours	11 hours	10 hours
Device dimensions	74mm × 145mm × 45mm	152mm × 74mm × 75mm	196mm × 143mm × 76mm

Please note this is not an exhaustive list of specifications and models can vary between suitability and effectiveness depending on their desired use and purpose.

FURTHER INFORMATION

For further information on thermal imaging, take a look at our Thermal Imaging range and their product descriptions alongside our blog Thermal Imaging for Ecologists.

ACCESSORIES AND SUGGESTED READING

Pulsar Neck Strap

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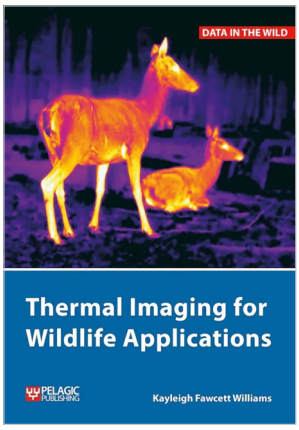

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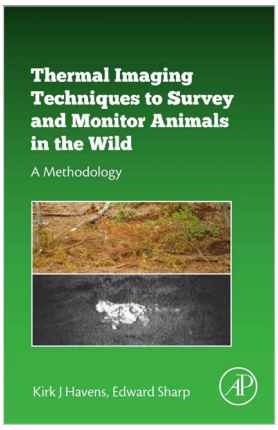

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Nanuk Protective Hard Case

#260912

We sell a range of accessories for thermal imaging devices, including various types of mounting options, hard cases, batteries and power banks.

Explore the complete range of thermal imaging equipment on our website. If you have any questions about our range or would like some advice on the right product for you, then please contact us via email at customer.services@nhbs.com or phone on 01803 865913