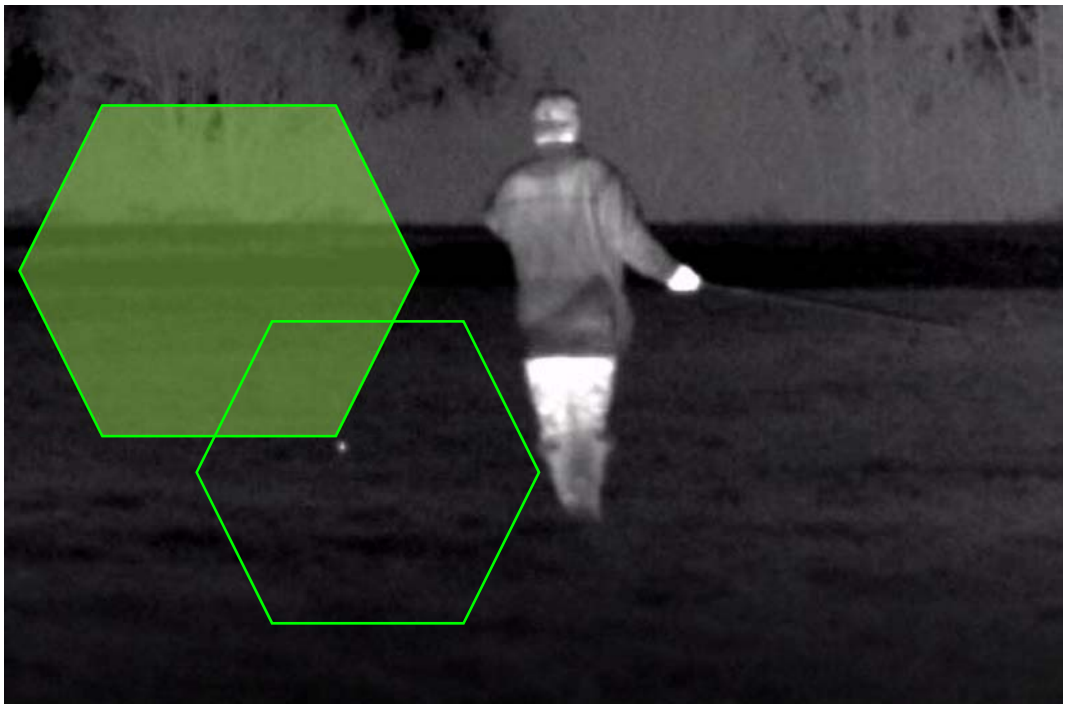
WMRG

WEST MIDLANDS RINGING GROUP



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GETTING THE MOST FROM YOUR THERMAL CAMERA

A GUIDE TO USING A THERMAL IMAGE CAMERA FOR RINGING AND SURVEYING

West Midlands Ringing Group have been at the fore of using thermal imaging technology in for use in Bird Ringing and conducting wildlife related surveys. Over the last 3 years the group have developed a wide range of uses for the camera, including using a thermal device to enhance traditional 'dazzling' methods.

THOMAS JACKS

BACKGROUND

SO WHY USE A THERMAL CAMERA

In the Spring of 2016 West Midlands Ringing Group members attended a small arable field near to Marsh Lane Nature Reserve where many breeding Lapwing had been reported. In a 45-minute session, 12 chicks were ringed having been found with binoculars and several observers. The figures were disappointing and perhaps represented 10% of the birds present. The potential benefits of a thermal camera were raised and having secured the use of a thermal camera the group returned the following week, where 38 chicks were found in less than 30 minutes. The following year 96 chicks were ringed in two 30-minute sessions. Productivity had increased and significantly disturbance to the field and the breeding birds had been reduced.

Following this initial success consideration was given to other applications where a thermal camera could be utilized. For our group the rest is now history, with over 1500 birds being ringed as a direct result of the use of thermal technology

EQUIPMENT

WHICH THERMAL TO CONSIDER?

We have worked with Thomas Jacks Ltd to establish which thermal image device is best suited to the applications described in this guide.

We have used several thermal devices and at present are using the Pulsar Helion XQ range. These devices come in a variety of focal Lengths, 28mm (wide angle), 38mm and 50mm (zoom). A minimum zoom over 4.1 should be avoided for dazzling.

Pulsar Helion – our preferred model whose capabilities extend beyond dazzling.

The 28mm has a range of 800m with a 2.3 – 9.2 zoom (x4)

The 38mm has a range of 1350m with a 3.1 – 12.4 zoom (x4)

The 50mm has a range of 1800m with a 4.1 – 16.4 zoom (x4)

These devices all have a built-in video, still image and streaming (to smart phone) capability which is recommended for survey work. Pulsar also produce the Helion XP range in the same focal lengths. The XP have a better sensor and produce clearer images; however, we have found the XQ range better suits our needs and is adequate for the work that we undertake.

The price of these units starts at around £1,900.00

The Pulsar XD50S was a previous model to the current range and provided perfectly suitable optical quality for locating and surveying wildlife, however this model lacked the video and streaming facility of the Helion Range.

RINGING APPLICATIONS

LOOKING AT USES FOR THE THERMAL CAMERA

Whilst our main use of the thermal camera is to enhance the conventional traditional dazzling method, we have found that its use is far broader than a single application.

- DAZZLING
- NEST FINDING
- NEST BOX CHECKING
- NOCTURNAL WILDLIFE SURVEYS
- PREDATOR SURVEYS
- ASSESSING SAND MARTIN NEST OCCUPANCY
- ROOSTING BIRD COUNTS
- OBSERVING NOCTURNAL BIRD BEHAVIOUR
- OBSERVATION OF MIST NETS SET FOR WADING BIRDS, OWLS, NIGHTJAR AND OTHER NOCTURNAL SPECIES.

Whilst the above list represents our key uses, the application of these devices continues with new developments being identified all the time.

Applications of Thermal technology by Others

Following a trial period of using the Thermal Image Camera and realising its potential not only for ringing, but for Surveying and Monitoring we wanted to ensure that we shared our knowledge to others. We realised at an early stage that the potential for such technology was great!

As a result of our promotion, and following media appearances on BBC Winterwatch and BBC News we received numerous queries about its potential. Several groups, bodies and organisations have now started to utilise Thermal technology and the feedback has been positive.

Here are some of the uses!

- Monitoring of Stone Curlew in the South of England
- Monitoring of Great Grey Owls in Canada
- Confirmation of Breeding Storm Petrels for the first time in Dorset
- Anti-poaching activity by UK Policing.
- Monitoring Raptor roosts
- Identification of Harvest Mice population in Staffordshire
- Identification of nocturnal feeding Golden Plover in the UK
- Ecological Impact Assessments

Surveying Wildfowl at night using the Pulsar XQ38F in the West Midlands

PRO'S AND CON'S

LOOKING AT THE PROS AND CONS OF THERMAL IMAGE DEVICES

In no uncertain terms, we have seen the benefits that thermal image cameras can bring to not just bird ringing, but to wider environmental surveys. For us, the positives to the thermal outweigh its disadvantages, our ringing totals for dazzled birds have increased from 1 or 2 birds per year, to 6-700 birds, with key species; Skylark, Grey Partridge, Woodcock and Wader numbers increasing all the time.

Even without our ringing data we can provide landowners with assessments of bird and mammal numbers on their property. Brown Hare numbers have been counted across several farms, and we have found unknown feeding flocks of Golden Plover.

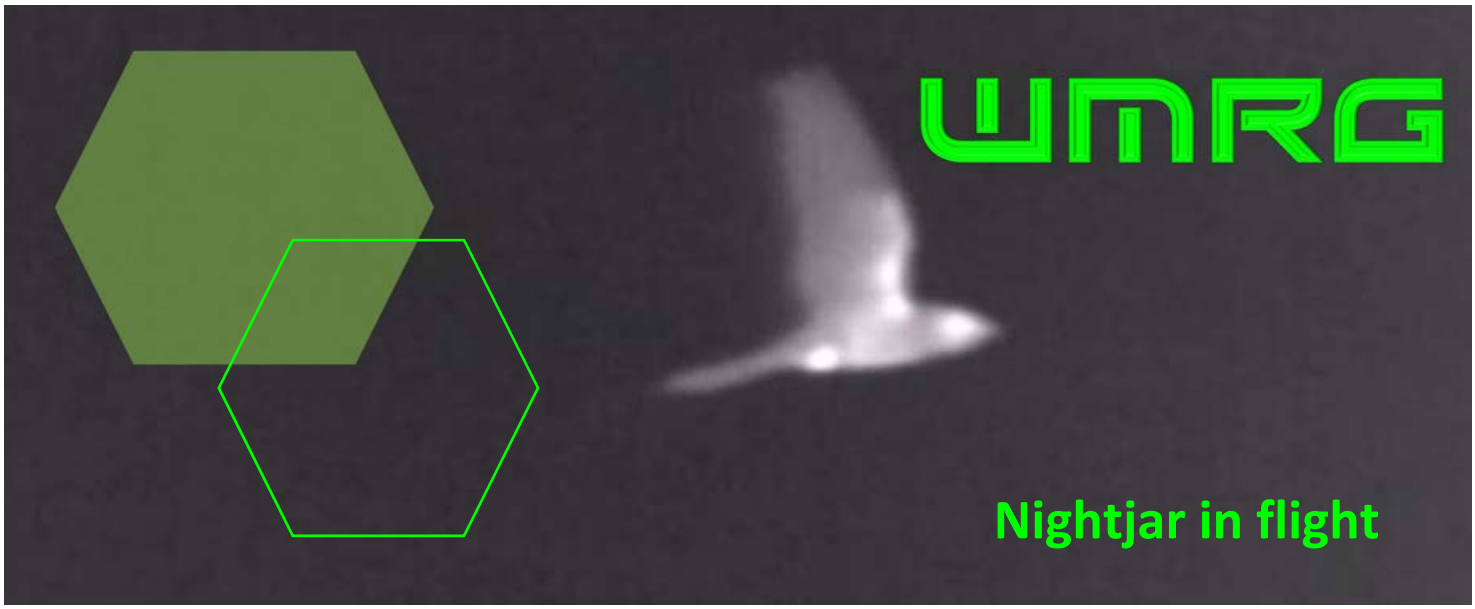
A key finding has been the impact that zero/strip till farming methods has on bird numbers, especially waders such as Common Snipe, Jack Snipe, Woodcock and Golden Plover. Farms that employ this strategy, overall tend to attract more birds. The reason being invertebrate numbers increasing in improved soil quality.

The cost of these units can be restrictive, but as technology improves the costs are likely to continue to fall. Some of the newer models are not best suited to lamping. Minimum zoom lengths of x4 and above are difficult to use for dazzling and realistically should be avoided. Whilst birds can still be found, it is often difficult to locate them with the torch as they appear on the screen over 4 times closer than they are.

We have provided feedback to Pulsar in respect of the more recent models. Whilst the company's main market is the hunting community, the wider applications of thermal technology are markets that they should not ignore.

We would Strongly recommend trialling a device before purchasing. We are more than happy for ringers and groups to visit us to see the devices in action.

Pro's	Cons
Reduces disturbance of birds in the field	Cost – the units can be expensive
Increased catch rates from torch only dazzling	Dense foliage can mask thermal signatures
Smaller species such as larks, pipits and jack snipe are easily located	Reduced capability on warm days – impact on breeding surveys
Allows a targeted approach – no requirement for random walking	Reduced capability in long and dense grasses
Video and still facility allow numbers to be counted at a later stage	Zoom facility can be poor
Nest boxes can be checked without opening	Certain models zoom and focal length is not suited to dazzling
Mist nets can be viewed without constant checking	Can be difficult to use for dazzling whilst on your own
Sand Martin Colonies can be assessed for active nests	Wi-fi streaming range is limited (20m)
Allows behaviour of birds to be viewed at night	Specific species cannot be identified by the camera at distance
Identifies species in areas that are previously unrecorded	
Reduced time in the field	
Increased safety to surveyor – sees water, ditches, obstacles etc	
Use of thermal extends to bats, mammals, moths, bees	



METHODOLOGY

STARTING OUT WITH A THERMA IMAGE CAMERA

This is not a prescriptive guide, but we have included a selection of tips and instructions on using a thermal camera for those who have not experienced the devices. With experience you will develop your own techniques which will suit your circumstances.

Using the imager is simply a version of the well-rehearsed technique of lamping, and we refer ringers to the Ringer's Manual to look at the relevant guidelines. The use of the thermal is simply for locating birds without the need for random scanning of areas with a lamp. Once a bird is found, then we revert to the dazzling technique using a torch or lamp.

The imager provides a means of targeting birds which can be seen from some distance, depending on the vegetation. Secondly, we have found that smaller species such as Skylark, Redwing, Fieldfare, Jack Snipe and Yellowhammer, which would be overlooked by conventional lamping, can also be seen and targeted.

We consider it to be a significant benefit to be able to scan fields quickly establish if there are any heat sources. This obviously increases the time efficiency for the ringers, but also can reduce overall disturbance by enabling targeting.

Skylark, caught using Thermal technology

Finding your birds

The areas that we visit consist of three main habitat types—arable fields, animal pasture, wet sedge/rushes. In our area of operation, we often find ourselves very close to major built-up areas, some being less than a mile from busy town centres. Whilst light pollution can have an impact on catches, it does not necessarily mean that dazzling will result in failure.

In arable fields; particularly young winter cereal crops and over wintered stubble we have been most successful. There are often good numbers of birds in most fields, but those where the farmer has adopted a 'no-plough'(minimal till) strategy are the best.

We find Woodcock and Common Snipe seem to like the vehicle tracks—this is useful for both finding the birds and then locating them with the torch.

Smaller birds are more visible in the short crop, although finding them does get a little trickier as the crop thickens. Winter crops of brassicas such as rape and kale still hold birds however a quiet approach is much more difficult.

Grazed pasture provides great habitat for Woodcock, Common Snipe, Meadow Pipit and Skylark; it also gives us a softer and quieter approach unless the ground is wet.

We have experimented with using sound to mask our approach. We have been successful using Skylark and the sound of a flowing river. We have had success and failure with all of these and the use of sound should be considered on an individual basis.

Light pollution and the state of the moon have had inconsistent effects on the catches; however we have caught on clear nights in a full moon. A cloudy dark night, with little light, a medium wind is often best.

When operating in wet areas of sedges and rushes, the density of growth of rushes (eg Juncus spp) is of key importance. We have found that success is limited in very dense growth because the key target species, Jack Snipe can be very difficult to see.

Jack Snipe can be caught using the thermal camera during the day and without the use of a torch; simply the thermal and a hand net. The main caveat here is to avoid days with bright sunshine. The rushes absorb heat very quickly and spotting a small Jack Snipe-sized heat source within a field of bright rush-clump-sized heat sources is extremely difficult. On a cold, dull day it is remarkably easy to find these birds, who can be caught with a slow steady approach. .

Locating and Catching

There are a number of options deployed to locate and catch birds. With experience we have been able to identify either specific species such as Woodcock, or generic groups such as larks, thrushes and waders, from sometimes quite a distance. This enables choices to be made about which birds to approach and when.

Once potential birds have been spotted using the imager then it is a case of gradually transitioning from imager to basic lamping.

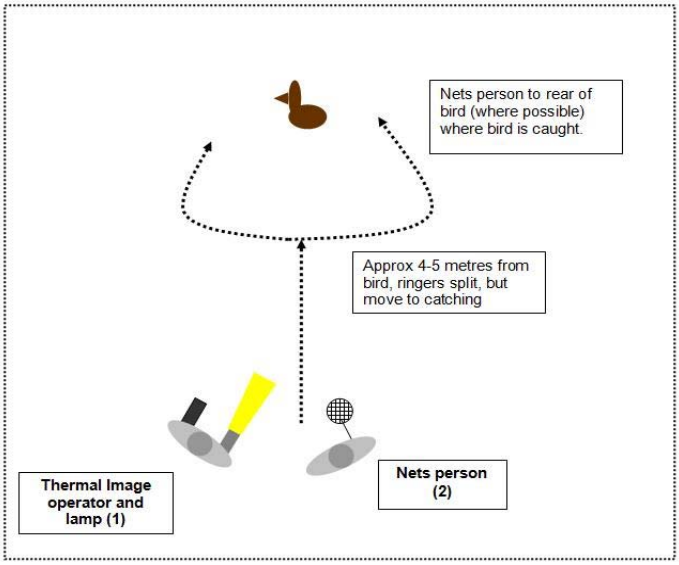
It is preferable for our methods for a two-person team to be utilized for several reasons, but mostly from a safety aspect. However, for those familiar with the land that they are operating on then an individual can operate alone.

Two-person Approach.

In ploughed or sown fields, it is possible to line the bird up with the thermal camera in either a line of crop or in a track mark. This allows more accuracy in finding smaller birds such as larks, thrushes and pipits.

The thermal operator can position themselves in direct line with the target bird and indicate to the net operator where the bird is located.

Skylark roosting in Winter cereal, note the crop lines – which are used to 'line-up' the birds



The two-person approach. **It is key that the torch beam is not broken until the point the bird is netted**

Both operators in this technique walk slowly towards the bird. The thermal operator will be the lead, making the decision when to move away from the catcher. At approximately 4 – 5 metres, the operator with the lamp should move in an arc towards to the head of the bird continuing to illuminate it. (a simple command can inform the catcher of this movement, however with experience we have found this becomes an automatic manoeuvre between the team.) We find that this keeps the bird's attention and allows the catcher to move to the rear and catch the bird.

Person (1) should be the lead with the torch and they should aim to cover the bird. Person (2) should place their beam in the centre of the lead's beam.

Both operators should then walk slowly towards the bird. At this point the thermal operator will be the lead, making the decision when to move away from the catcher. At approximately 4 – 5 metres, the operator with the lamp should move in an arc towards to the bird continuing to illuminate it, with person 2 moving to the rear of the bird where it is netted.

Single Approach.

This method is perhaps the most similar to traditional dazzling. Both operators walk together until a heat source is identified in the area. Between 50 & 100 metres from the bird, the pair stop and the thermal operator, who, in this method is also using a torch illuminates the bird. Once the bird is identified the net operator takes hold of the torch (or illuminates their own) and approached the bird alone. The thermal operator can watch the approach from a safe distance. This method allows for a quieter approach and prevents the torch beam bring broken until the bird is caught.

The single approach method is utilised for catching Jack Snipe in the daytime. When targeting these birds, the thermal operator will control the device and have the net. The habitat frequented by Jack snipe can see them disappear as the ringer approaches and their view changes, so it is important that they have the thermal camera. Jack Snipe will sit tight on approach, however sudden movements or stopping nearby can see them flush.

It is important where possible to approach from the rear of the bird and move slowly and steadily, and where possible without stopping until the bird is netted.

Using a thermal camera in daylight hours to catch Jack snipe

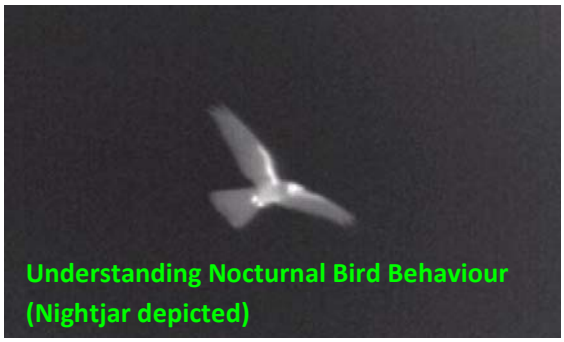
Thermal Camera Still Images

The following images were taken with Pulsar Thermal Camera (XQ38F) and will give an indication of the applications that can be considered with Thermal technology.

Surveying Short Eared Owls.

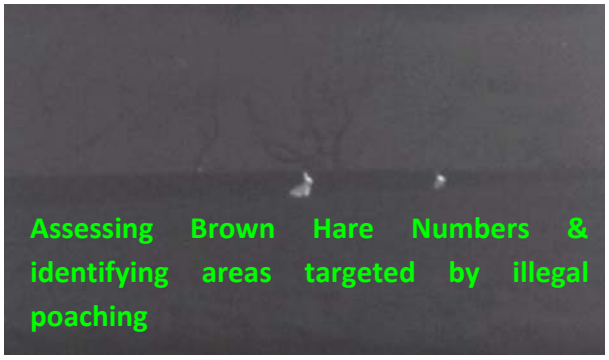
Understanding Predator Numbers

Wildfowl Surveys



Understanding Nocturnal Bird Behaviour (Nightjar depicted)

Upland Wading Breeding monitoring (Curlew depicted)



Assessing Brown Hare Numbers & identifying areas targeted by illegal poaching

Nest monitoring (Active Swallow Nest)

Do's and Don'ts

Bird welfare is vital in all ringing activities. Whilst we would suggest that the use of a thermal camera when dazzling minimises disturbance to roosting birds we still ensure that we follow strict guidelines in respect of dazzling.

It is also important that you consider your own personal safety before venturing out at night. Ensure that you are familiar with the land that you visit and that you are aware of hazards.

We have provided some simple tips for safe and successful dazzling

Do	Don't
Always tell someone where you are going.	Put yourself at risk of injury or death
Where possible take a mobile phone in case of emergency	Visit land without first conducting your own risk assessment
Ensure you have permission to be on the land	Attend coastal regions unless you are familiar with tides and and the landscape
REMEMBER BIRD WELFARE MUST BE YOUR PRIORITY	Enter watercourses at night unless
Ring birds in situ – where possible	Do not Approach poachers or people illegally on the land, dial 999
Ensure you are aware of hazards on the land	Do not approach large flocks of roosting birds
Use a lightweight net, with fine thin mesh (210d mist net is ideal) to reduce drag)	If a roosting bird flushes do not repeatedly try to catch it
Check your net for large holes or damage before going out	Do not attempt to catch in extreme weather conditions
Keep your landowners informed of what you have caught	Do not approach livestock at night
Keep you landowners informed of any issues you identify on their land	Do not attempt to catch paired breeding birds
Follow the rules in the BTO ringers manual	Cause obstructions to roads or farm tracks at night
Follow the countrycode – even at night	Do not leave gates open
Wear dark clothing, that is preferably not noisy (waterproof trousers are loud at night!)	Repeatedly visit the same fields on consecutive nights
Ensure that you have sufficient batteries and charge for your thermal and torch	Drop your thermal camera!

WE HOPE YOU ENJOY THIS GUIDE FOR FURTHER INFORMATION PLEASE VISIT

WWW.WESTMIDLANDSRINGINGGROUP.COM

TWITTER: **@RINGERSWM**

FACEBOOK OR YOU TUBE **WEST MIDLANDS RINGING GROUP**

EMAIL: **WMRG.CONTACT@GMAIL.COM**