

# Capture guide

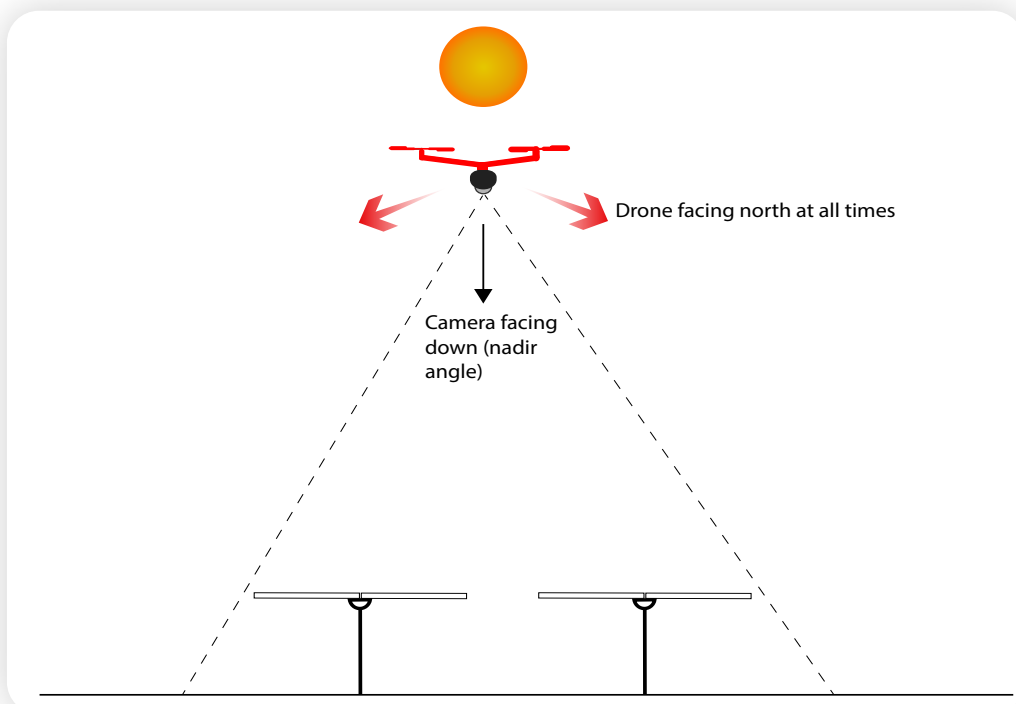
# Pre-flight planning (tracking systems)

## Introduction

The 5 P's = Preparation and Planning Prevents Poor Performance! Thermography is a skill and so is flying a drone accurately, so this guide is designed for competent persons. The following describes the requirements for a successful survey to our workflow, along with some general tips. We hope you find it useful but please do get in touch with any questions.

## Camera Angle

For this inspection the camera will be in the Nadir position (Birdseye view, Camera pointing directly downwards). The flight path is programmed to fly in the center of the row/s under inspection, at a specific height so that the field of view shows the row/s under inspection.

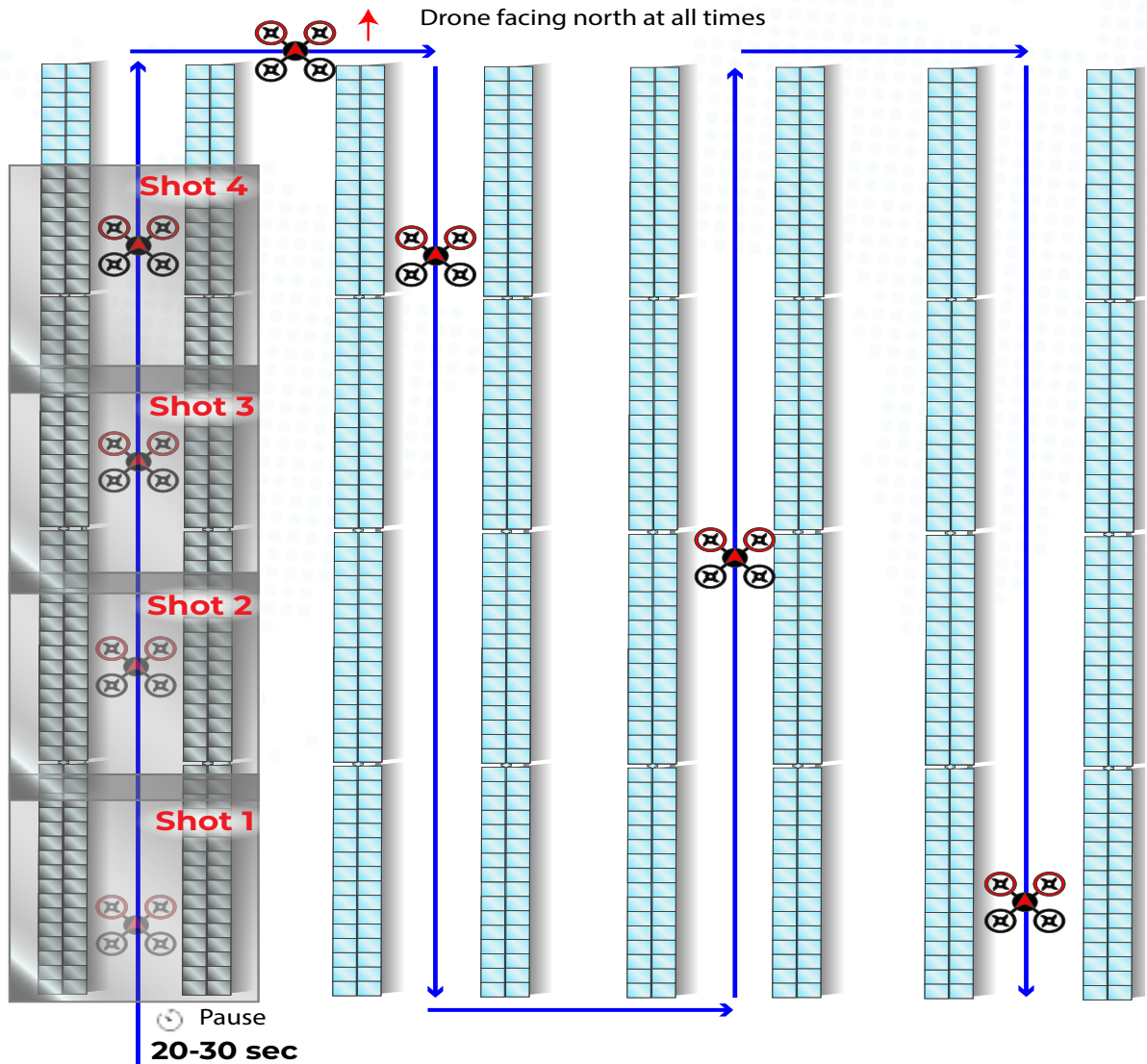


## Flight Path Planning

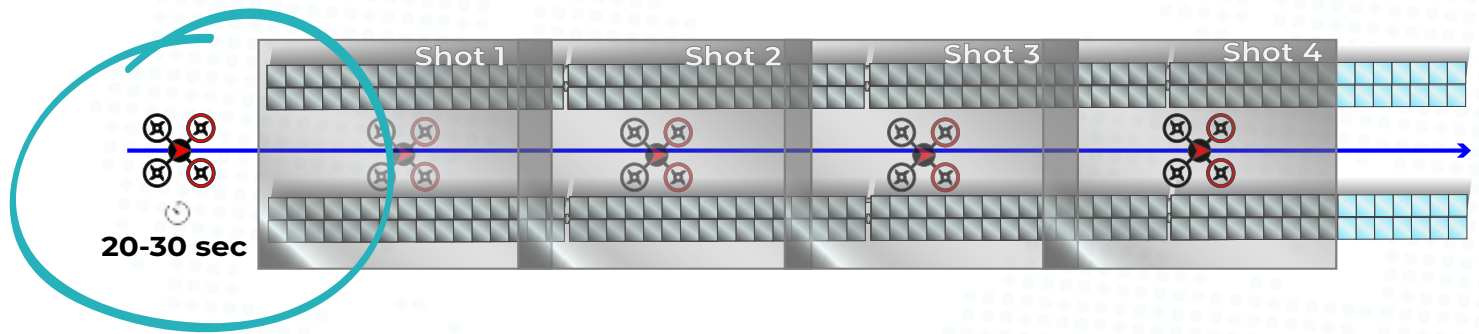
Solar farms are amazing feats of engineering and are built with precision. It therefore makes sense to program the drone to follow the rows just as accurately. Knowing exactly where the drone is when it captures data enables reporting the correct position of any faulty solar modules.

### Tip

The red propellers and red arrow on the drone indicate the way that the drone is facing, whilst the black arrow indicates the direction of the camera. Note that neither of these change with the direction of travel.



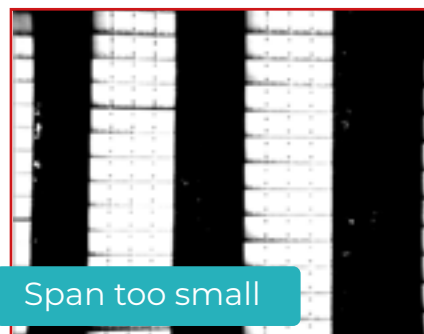
Before you start flying, switch on your thermal camera and allow it to warm up for 10-20 minutes. During this warm up time set the camera to calibrate often, say every 2-5 minutes. Once the camera has had a chance to warm up properly and calibrate several times your image should be looking good. Now you can switch off the calibration function before the data capture flights. Recalibrate the camera in between flights and during battery swaps.



## Pause Checks

Program a 20-30 second hover for waypoint 1 and check:

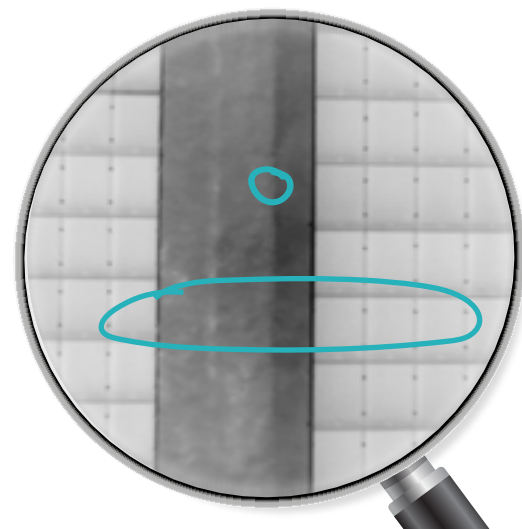
- The camera is facing parallel to the rows.
- The shot is framing the correct row/s under inspection, not the to either side.
- Ensure the thermal image is correctly tuned and NOT in auto mode.

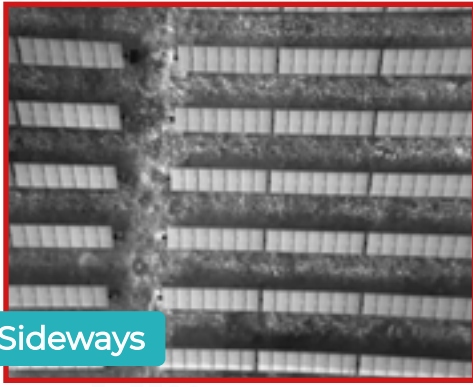


Once you have adjusted settings so your image looks good; keep the camera **FIXED** in manual mode, NOT auto. If manual mode is not fixed, the settings will drastically change if you experience glare.

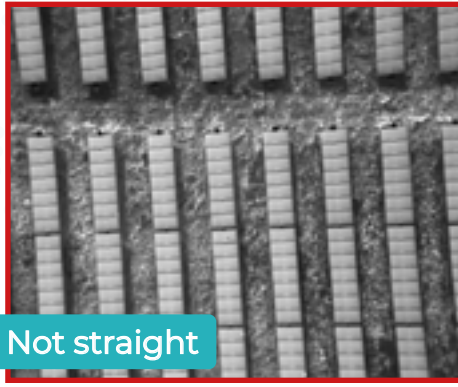
## Image Tuning

It is important that the images are well tuned, to ensure that anomalies are as noticable as possible. On a a correctly tuned image, elements such as shadows and individual junction boxes should be clearly visible, as seen in the example image.

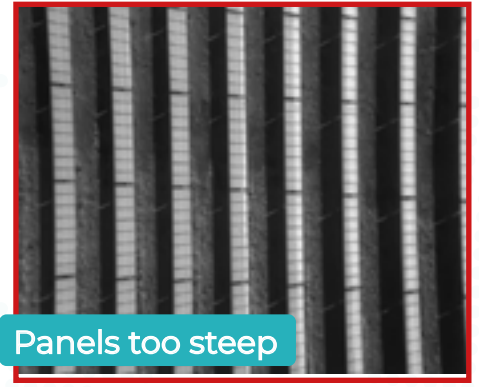




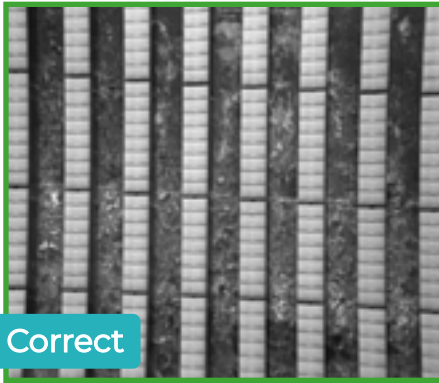
Sideways



Not straight



Panels too steep



Correct

### Image

As the drone flies along the rows make sure they remain well framed and straight, by making very fine adjustments to the camera tilt and yaw as necessary.

A 2nd controller is sometimes best.

### Inspection timing

Do not attempt to inspect the modules early in the morning or late in the evening when the panels are too steep. If you do it will cause inter-row shading and heat reflections as per the example above. Aim for midday when the panels are flattest.

### Shot timing

Regular shots are taken so that there is a small overlap between images. Speed is set to avoid motion blur.

