



A Division of Transnet SOC Limited

## INFRASTRUCTURE ENGINEERING

### ELECTRICAL DEPARTMENT SPECIFICATION

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#### SPECIFICATION FOR INFRARED THERMAL IMAGING CAMERA

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Two handwritten signatures are shown, each on a horizontal dashed line. The top signature is for Rotondwa Ludzulu and the bottom signature is for Molefi Moeketsane.

Date: 24 January 2024

Circulation Restricted To:

Transnet Freight Rail - Infrastructure

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## **1. SCOPE**

- 1.1. This specification stipulates Transnet's requirements for the supply and delivery of a handheld infrared thermal imaging camera.
- 1.2. The thermal imaging camera shall be suitable for industrial maintenance, electrical inspections, and mechanical diagnostics applications
- 1.3. The unit shall be of proven industrial design and compliant with applicable IEC and EMC standards

## **2. TENDERERS**

Tenderers shall submit a technical data sheet that complies with this spec. If the equipment offered does not comply with specific clause/s, a separate sheet may be used to clarify the extent of non-compliance to specific clause.

## **3. MECHANICAL AND ENVIRONMENTAL CONDITIONS**

Equipment to be supplied against this specification shall be suitable for satisfactory operation under the following conditions

### **3.1. Atmospheric condition**

- |                                    |                             |
|------------------------------------|-----------------------------|
| 3.1.1. Altitude                    | : 0 – 1800m above sea level |
| 3.1.2. Ambient Temperature         | : -10 ° C to 40° C          |
| 3.1.3. Relative Humidity           | : As high as 90 percent     |
| 3.1.4. Ambient Storage Temperature | : -10° C to 50° C           |

### **3.2. Construction**

- 3.2.1. The weight of the equipment shall not exceed 1.5kg.
- 3.2.2. The equipment shall withstand a drop of at least 1.5m
- 3.2.3. Vibration and shock shall comply with IEC 60068-2-6 and 60068-2-27

## **4. THERMAL IMAGING PERFORMANCE REQUIREMENTS**

### **4.1. Infrared detector**

- 4.1.1. Infrared resolution shall be minimum 120 × 90 pixels (10,800 pixels).
- 4.1.2. Spectral response shall be within 6 µm and 16 µm (long wave infrared).
- 4.1.3. Thermal sensitivity (NETD) shall be 70 mK at most.
- 4.1.4. The equipment shall have a frame rate of at least 8 Hz.

### **4.2. Optical Performance**

- 4.2.1. The Instantaneous Field of View (IFOV) of the equipment shall not exceed 0.007 mRad.
- 4.2.2. The optical system shall provide a minimum Distance-to-Spot (D:S) ratio shall be minimum 120:1.

4.2.3. The camera shall have a field of view of at least  $50^{\circ} \times 38^{\circ}$ .

4.2.4. Minimum focus distance shall not exceed 50 cm.

## **5. TEMPERATURE MEASUREMENT REQUIREMENTS**

5.1. The equipment shall be capable of measuring temperatures over a range of  $-20^{\circ}\text{C}$  to at least  $380^{\circ}\text{C}$ .

5.2. For target temperatures  $\geq 0^{\circ}\text{C}$ , accuracy shall be  $\pm 2^{\circ}\text{C}$  or  $\pm 2\%$  at  $25^{\circ}\text{C}$  ambient.

5.3. The equipment shall be able to display centre-point temperature measurement.

5.4. The equipment shall be capable of providing hot and cold spot markers.

## **6. IMAGE PROCESSING AND DISPLAY**

### **6.1 Display**

6.1.1 The unit shall have a minimum 3.5-inch LCD touchscreen.

6.1.2 Display resolution shall be minimum  $320 \times 240$  pixels.

6.1.3 Display orientation shall be landscape.

### **6.2 Image Enhancement**

6.2.1 Level and span adjustment shall support smooth auto and manual scaling.

6.2.2 The unit shall support image blending technology with continuous blending from 0 % to 100 % infrared/visible mix.

6.2.3 The unit shall provide a minimum of six (6) standard colour palettes, including:

- Iron bow
- Blue - Red
- High Contrast
- Amber
- Hot Metal
- Grayscale

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## **7. DATA STORAGE AND FILE MANAGEMENT**

7.1. Internal memory shall be minimum 4 GB.

7.2. The unit shall include a slot supporting micro-SD card up to 32 GB.

7.3. Image capture shall allow one-handed capture, review, and saving.

7.4. Image file formats shall include:

- Non-radiometric JPEG
- Fully radiometric format

7.5. Export file formats via desktop software shall include but not limited to the following:

- .bmp
- .dib
- .jpg

- .tif
- .tiff

## **8. CONNECTIVITY AND SOFTWARE**

- 8.1 The equipment data transfer shall be via Mini USB interface.
- 8.2 The camera shall support automatic image upload to a WiFi network.
- 8.3 The unit shall be compatible with manufacturer desktop software providing full analysis and reporting capability.

## **9. POWER SUPPLY REQUIREMENTS**

- 9.1 The unit shall operate on a field-replaceable rechargeable lithium-ion smart battery.
- 9.1 Battery shall include LED charge level indication.

## **10. ACCESSORIES**

The following items shall come standard with each equipment:

- 10.1. Infrared Camera
- 10.2. AC power supply
- 10.3. Lithium Ion Battery
- 10.4. USB Cable
- 10.5. Carry bag
- 10.6. Desktop Software CD or Link
- 10.7. Micro SD card – 32GB