

Peshawar Electric Supply Company (PESCO)

Technical Specification — Thermovision (Thermal Imaging) Camera*Long-Range Hotspot Detection*

This specification sets out the detailed technical requirements for a professional, high-performance thermovision (thermal imaging) camera system for the inspection of PESCO's electrical transmission and distribution assets, for long-range detection of hotspots, loose connections, insulation-related abnormalities, overheating components and other thermal anomalies — including in hilly, mountainous, rugged and difficult-to-access terrain.

1. Scope and Intended Application

The equipment shall be a professional, high-performance thermovision/thermal imaging camera system suitable for inspection of electrical transmission and distribution assets and for detection of hotspots, loose connections, insulation-related abnormalities, overheating components and other thermal anomalies from long distances.

The camera shall be suitable for use by PESCO in hilly, mountainous, rugged and difficult-to-access terrain, where physical approach to transmission towers, conductors and other electrical installations may be difficult, unsafe or impractical.

Typical inspection targets shall include, but shall not be limited to:

- Jumpers and connectors on transmission towers
- Insulators and associated fittings
- High-tension conductors
- Clamps, joints and termination points
- Transformer fuses and associated hardware
- Busbars and electrical connections
- Substation and transmission-line equipment
- Other power-system components susceptible to thermal abnormalities

The equipment shall be effective for long-range detection of hotspots and thermal anomalies on power utility assets. The bidder/manufacturer shall propose its best technically suitable solution for achieving maximum practical long-range hotspot detection under power utility field conditions.

The offered solution may utilize an appropriate thermal lens, telephoto thermal optics, interchangeable lens system, optical/thermal combination, image enhancement technology, or other technically suitable configuration, provided that the proposed arrangement effectively meets PESCO's operational requirements.

Each bidder shall clearly state in its bid the maximum effective hotspot detection range of the offered camera/system. The quoted range shall be supported by the manufacturer's published technical literature, datasheet, catalogue, test report or other verifiable technical documentation.

Note: Preference will be given to the bidder providing a thermovision camera solutions with long range detection capability of hotspots.

2. Technical Performance Requirements

The thermal imaging camera shall have an infrared detector resolution of minimum 640 × 480 pixels or higher. Higher detector resolution and enhanced thermal imaging capability may be offered and shall be considered during technical evaluation.

The camera shall provide sufficient thermal sensitivity, image clarity and spatial resolution to enable reliable detection of temperature differences and hotspots on transmission-line and substation components.

3. Optical / Thermal Lens System

The camera shall be provided with an optical/thermal lens arrangement suitable for long-range transmission-line inspection. PESCO does not prescribe any particular lens focal length or physical lens size; the bidder shall select and offer the most appropriate lens configuration compatible with the offered thermal imaging camera.

The offered lens/system shall:

- Provide effective long-range observation and hotspot detection
- Be fully compatible and calibrated with the offered camera
- Maintain adequate thermal image quality at long distances
- Permit inspection of transmission towers and associated equipment from safe and practical locations
- Be suitable for repeated outdoor field use
- Provide practical portability and handling for inspection teams

Where interchangeable lenses are required to achieve both long-range and general inspection capability, the bidder shall clearly identify and include the required lenses in the offered configuration.

4. Display, Storage and Documentation

The equipment shall incorporate a suitable high-resolution display/viewfinder for clear viewing of thermal images under outdoor field conditions.

It shall support:

- Storage of thermal/radiometric images
- Storage of visual images, where applicable
- Date and time stamping
- Transfer of data to a computer or compatible device
- Suitable internal/removable storage
- Standard communication interface(s)

The bidder shall specify the available storage capacity and connectivity options.

5. Analysis and Reporting Software

The system shall be supplied with the manufacturer's applicable thermal image analysis and reporting software, where required for full utilization of the camera.

The software shall preferably provide facilities for:

- Radiometric image analysis
- Temperature measurement
- Hotspot identification
- Image annotation
- Adjustment of measurement parameters
- Report preparation
- Export of inspection results

Necessary software licence(s), if applicable, shall be included in the offered package.

6. Weight

The bidder shall clearly state the camera weight and total operating weight with the proposed long-range lens and necessary accessories.

7. Battery and Power Supply

The camera shall be supplied with rechargeable battery/batteries and appropriate charging equipment suitable for operation from the locally available AC supply.

The bidder shall specify:

- Battery type
- Typical operating duration
- Charging time
- Number of batteries supplied
- Charger requirements

Adequate batteries shall be provided to facilitate practical field inspection activities.

8. Bidder's Mandatory Technical Information

The bidder shall submit comprehensive technical literature/data sheets for the offered equipment, clearly indicating:

1. Manufacturer's name
2. Exact make and model
3. Country of origin
4. Catalogue/model number
5. Infrared detector resolution
6. Thermal sensitivity
7. Temperature measurement range and accuracy
8. Lens type(s) and focal length(s)
9. Field of View / IFOV, where applicable
10. Detector pitch, where applicable
11. Optical/digital zoom
12. Camera and lens weight
13. Environmental/IP protection rating
14. Battery operating time
15. Standard and optional accessories
16. Applicable international standards/certifications
17. Maximum effective long-range hotspot detection capability of the offered system
18. Target size and/or technical basis associated with the stated detection range
19. Details of all lenses/accessories required to achieve the declared range

Claims relating to long-range hotspot detection shall be supported by manufacturer-issued technical documentation, test evidence or other verifiable information.