

Thermal Imaging Camera

[Bid Specifications]

- I. **Purpose:** To establish minimum standards for the Thermal Imaging Camera [TIC] and Truck Mounted Charging System. The TIC is designed to be a tool for fire fighters and first response emergency personnel and used for search and rescue, fire scene size-up, overhaul, location of victims and advanced fire-fighting and first response applications.
- II. **Type:** The thermal-imaging camera covered by this specification shall be of the type incorporating a 320 x 240 pixels Vanadium Oxide Microbolometer focal plane array sensor. The TIC displays black and white representations of the scene on a 90 mm [3.5"] diagonal LCD display. The TIC is optimised for fire-fighters in its ergonomic design and ease of incorporation with fire-fighting gear. It features a dual handle for easy handoff / handling and a high impact, heat resistant housing that ensures that the TIC will withstand the rigors of the fire-fighting environment. It is further protected by a rubber bumper system that provides additional protection from extremely harsh environments. The TIC shall be tested to and comply with the following standards:

Water / Dust Ingress	International Standard EN 60529; Degrees of Protection Provided by Enclosures (IP Code) - Rating IP67 (Dust and Water Ingress)
Direct Flame / Heat Exposure	simulated US-Standard NFPA 1981- 2002 Edition and simulated US-Standard NFPA 1982 - 1998 Edition
Vibration	MIL-STD-810 E Category 1 Loose Cargo Transport
Radio Frequency Interference	CE / EN 61000-6-2 and EN 61000-6-4, FCC Part 15
Rollover and Radio Frequency Interference [Truck Charger]	simulated US-Standard NFPA 1901 -12,1.7 [Rollover], Directive 72/245/EEC for electric / electronic sub-assemblies for vehicles valid with the latest amendments (CE, E1), FCC Part 15

- III. **Component Parts:** The product shall consist of the following component parts and optional accessories:
1. Thermal Imaging Camera with optional Standby **or** with optional 2x Digital Zoom
 2. Lithium-Ion Battery Packs
 3. Desk top stand alone battery charger with wall plug
 4. Optional Vehicle Mounted Charging System
 5. Optional Attachments: Carabiner, Wrist Strap, Shoulder Strap and Retractable Lanyard
 6. Video Connector and optional Video Connector Cable [SMA – BNC]
 7. Optional Tripod Attachment
 8. Optional Vehicle Mounted Bracket
 9. Carrying Case
 10. Instructions for Use
 11. Direct Temperature Measurement
 12. „Heat-Seeker-PLUS” Function
 13. Image Detail Enhancement [IDE]
 14. Colour Palettes
 15. Optional integrated short range transmitter
 16. Optional Videotransmitter (long range)
 17. Optional Receiver Station
 18. Optional Video Capture
 19. Optional Permanent Power Supply

Specific Requirements

1. Thermal Imaging Camera

Sensor	
Type:	Uncooled fix-focus Vanadium Oxide Microbolometer Focal Plane Array Detector.
Array Size:	320 x 240 Pixel
Spectral Response:	8 – 14 μm
NETD:	$\leq 65 \text{ mK}$ [in High Sensitivity Mode] $\leq 240 \text{ mK}$ [in Low Sensitivity Mode]
Dynamic Range:	-40°C to 160°C [-40°F to 320°F] in High Sensitivity Mode -40°C to 560°C [-40°F to 1040°F] in Low Sensitivity Mode
Video Standard:	16 bit, real time, analogue
Frame Rate:	30 Hz
Video Output:	NTSC

Optical	
Lens:	19 mm, F 1,4
Field of View:	36° horizontal, 27° vertical, 41,6° diagonal
Focus:	1 metre to infinity [optimal 1 to approx.25 metres]
Optional Zoom	Digital, 2x

Electrical	
Power Supply:	Supplied by an integral replaceable battery pack.
Power Consumption:	< 6 W nominal
Video Output:	A standard SMA connector is included under the display for direct connection to a remote video source, analogue RS170, 30Hz, 75ohm impedance. A SMA to BNC adapter is available as an accessory.
Display:	90 mm [3,5"] TFT, LCD backlit display
Display Resolution:	600 x 234 pixels

Housing	
Dimensions:	Approx. 275 mm x 205 mm x 112 mm [10,8" x 8,1" x 4,4"]
Base Weight:	1,2 Kg [2.8 Lbs.] nominal, camera and battery [battery 100g]
Materials:	Outer case and bumper materials pass simulated NFPA 1981 – 2002 edition [direct flame exposure] and NFPA 1982 - 1998 edition [heat exposure]
Outer housing:	Bayer PCPET Makroblend
Rubber Bumpers:	FR Neoprene
Display cover:	Heat and scratch resistant polycarbonate [replaceable disposable display covers are available as accessory from the same material]

Environmental	
Thermal Tolerance:	The TIC is designed to have the following temperature tolerances
Ambient Temperature:	Operating Time
80°C [176°F]	>30 minutes
120°C [248°F]	>20 minutes
260°C [500°F]	> 8 minutes
-30 C [-22°F]	>40 minutes
-40°C [-40°F]	>25 minutes

Environmental continued	
Water / Dust Ingress:	The TIC shall resist the ingress of dust and water and must conform to International Standard EN 60529; Degrees of Protection Provided by Enclosures (IP Code) - Rating IP67 (Dust and Water Ingress)
Impact / Drop Test:	Dropped 3 consecutive times onto concrete from 2 metres at any angle with no operational defaults or physical compromise of the outer housing.
Vibration:	The TIC and components housed in the carrying case shall be resistant to vibration and must conform to MIL-STD-810 E, Category 3, loose cargo transport.
RFI / EMC:	The TIC should not interfere with standard fire-fighter frequency bands at power levels found in hand-held [3 - 5 W] and vehicle mounted systems [~100 W]. Communication / electronic devices cannot affect the TIC to the point where navigation with the TIC is compromised when the TIC is subjected to RF interference of 80 MHz to 1 GHz at 30 V/m. The TIC must meet RFI emissions and susceptibility of CE, according to EN 61000-6-2 und EN 61000-6-4.

Warnings / Indicators	
TIC Status:	There will be one green LED to indicate the TIC status. It will function as follows:
Green:	TIC in normal mode and functioning correctly.
Flashing Green:	TIC in standby mode or 2x zoom switched on and functioning correctly.
Battery Status:	Total battery capacity will be indicated in the viewing area with a row of 3 LED's - They will function as follows:
Green:	Full Battery Capacity [100 % to approx. 50 %]
Yellow:	Marginal Battery Capacity [\leq 50% Capacity]
Red:	Battery Warning – Lit for 15 min. before shutdown
Flashing Red:	Battery Shutdown – Flashes 60 sec. before shutdown
Shutter Indicator:	
Shutter / Image Refreshment	On screen indicator, which appears as a small block in the upper left corner of the display when the camera shutters, indicating that a re-scan of the area is necessary.
Low Sensitivity Indicator:	On screen indicator which appears as the letter "L" in the lower left portion of the screen. This indicates activities when the TIC is in Low Sensitivity [Fire-fighting] mode.
Over Temperature Warning:	There will be one red LED to indicate the TIC's over-temperature status. It will function as follows:
Not Lit:	TIC is within operational thermal limits
Flashing Red:	TIC has exceeded recommended operational thermal limits

2. Rechargeable Lithium-Ion Battery Pack

Battery Type:	Lithium-Ion battery pack 7,2V, 2150mAh, rechargeable, replaceable
Battery Location:	Inside the handle
Battery Weight:	Approx. 100 grams
Operating Time:	>2 hours, when fully charged

3. Stand-Alone Battery Charger

Battery Charge Time:	> 2 hours nominal, depending on time of usage.
Power Supply:	230 V AC [110 V optional]

4. Vehicle Mounted Charger

Functionality:	The optional truck mounted charger will charge the TIC and one spare battery while properly installed in the vehicle. Each truck charger will come with a mounting kit for installation on the vehicle. The charger will draw less than 1.5 amps of power.
Battery Charge Time:	3 hours nominal, trickle maintenance charge.
Power Supply:	12 – 24 V DC
Vibration:	The truck mounted charger must safely charge the TIC while in a moving vehicle – reference MIL-STD-810 E, Category 3, loose cargo transport – vibration resistance
Rollover:	The truck mounted charger must meet the rollover requirements identified in NFPA 1991 – 12 -1.7
RFI / EMC:	The optional truck mounted charger must meet RFI emissions and susceptibility of CE, according to EN 61000-6-2 und EN 61000-6-4 and <u>Directive 72/245/EEC for electric / electronic sub-assemblies for vehicles valid with the latest amendments (CE, E1).</u>
Dimensions:	Approx. Width 265 mm [10,4"], depth 145 mm [5,8"], Height 190 mm [7,5"] [without TIC] and 235 mm [9,3"] [with TIC]
LED Indicators	The truck mounted charger user interface will consist of 3 LED's: 1 LED for each battery [inside the TIC and one spare] and 1 LED for the system status. They will operate as follows:
Battery Status LED:	
Not Lit	Battery not present
Flashing Green-Fast:	Charge in process
Green:	Battery fully charged
Red:	Fault, lost signal to battery
System Status LED:	
Not Lit:	System fault, no voltage
Green:	Power On, System Operational

5. Attachments and Carrying Options

Carabiner:	Optional carabiner attachment for securing the TIC to a tool belt or other gear.
Wrist Strap / Bunker Clip:	Optional Wrist strap / Bunker clip attachment. This will be made of fire and heat resistant materials.
Shoulder Strap:	Optional flame and heat resistant shoulder strap. It will include an emergency release clip.
Retractable Lanyard:	Optional retractable lanyard for use with the TIC / carabiner assembly. Retraction line is to be made of a Kevlar core material. Housing to be heat resistant.

6. Video Connector

Video Output:	All TIC's shall come standard with a SMA video output – analogue RS170, 30Hz, 75ohm impedance.
Adapter Cable:	A SMA to BNC adapter cable is available as an accessory.

7. Tripod Mounting

	A tripod mounting attachment shall be available as an option.
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8. Vehicle Mounted Bracket

	The optional truck mounted bracket will carry the TIC and one spare battery while properly installed in the vehicle. Each truck mounted bracket will come with a mounting kit for installation on the vehicle. (It is the vehicle mounted charger without electronics.)
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9. Carrying Case

Contents:	Case will hold, as a minimum, the TIC, two lithium ion battery packs, manual, carrying attachments, stand-alone battery charger assembly
Water / Dust Ingress:	The Case shall resist the ingress of dust and water and must conform to International Standard EN 60529; Degrees of Protection Provided by Enclosures (IP Code); Rating IP54 (Dust and Water Ingress)
Impact / Drop:	Dropped 3 consecutive times onto concrete from 1 metre at any angle with no operational defaults or physical compromise of the case or contents

10. Operation and Instruction Manual

	A multilingual manual is included as standard equipment for the TIC and is delivered on a CD-Rom. A printed multilingual quick start guide is included as standard equipment for the TIC
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11. Direct Temperature Measurement

[no remote thermometer, as surface emissive correction factors are not adjustable!]

Installation:	Integrated inside of the TIC without any add-on devices
Device:	Measurement taken from FPA Range
Range:	0°C to 150°C [32 °F to 300 °F] in High Sensitivity Mode 0°C to 500°C [32°F to 1000°F] in Low Sensitivity Mode
Tick Marks:	0°C [32 °F], 50°C [100°F], 100°C [200°F], 150°C [300°F] in High Sensitivity Mode and 0°C [32 °F], 125°C [250°F], 250°C [500°F], 375°C [750°F], 500°C [1000°F], in Low Sensitivity Mode
Accuracy:	±15 °C [27 °F] or ±10 % which ever is greater For temperatures greater than 225 °C [435 °F] ±20 %
Readout:	Thermometer style Bar Indicator in Celsius or Fahrenheit available Digital temperature feature displays the approximate number value of the temperature of objects located in the spotter

12. Heat-Seeker PLUS Indicator

Installation:	Integrated inside of the TIC without any add-on devices
Device:	Measurement taken from FPA
Readout:	Graduated colour [yellow to orange to red] of portions of a scheme that are above 135°C [275°F]-yellow, 147°C [297°F]-red, in High Sensitivity mode, or 450°C [842°F]-yellow, 490°C [914°F]-red, in Low sensitivity mode As example: for quick location of hottest objects during deployment, to facilitate direction and dosage of water to minimize consequential damage by extinguishing agents

13. Image Detail Enhancement (IDE)

Installation:	Integrated inside of the TIC without any add-on devices
Device:	The image is enhanced so that it matches the total dynamic range of the original image, thus making the details visible to the operator even in scenes with extreme temperature dynamics.

14. User-Selectable Colour Pallets

Installation:	Integrated inside of the TIC without any add-on devices
Device:	User selectable pallet that offers five options: white hot, black hot and three different colour options
Readout:	Single-button operation provides 3-second indication of the user selected pallet displayed on the TICs display

15. Integrated Short-Range Video Transmitter (Optional)

Installation:	Integrated inside of the TIC without any add-on devices
Device:	Transmits a dedicated frequency that can be received by MSA's video receivers

16. Optional Wireless Video Transmission

Installation:	Stand-alone Wireless Transmitter module to be attached / detached from the TIC by the user without use of tools. May be included at time of purchase or added to any base camera without modification
Channels:	2 user selectable channels in 2.1 GHz and 2.4 GHz band, subject to local regulation
Power:	450mW EIRP
Power Supply:	1 x Lithium Ion battery [same as TIC battery]
Operating Time:	> 4 hours, from 1 fully charged battery
Weight:	approx. 500 g
Approvals:	EN 301 489 Teil 1 & 3 [2000-08], EN 300 440-2V1.1.1 Teil 1 & 3 [2001-09], BAPT 222 ZV 105 & 106, BAP 122 R1, EMC, EN 61000-6-3 and EN 61000-6-2 / FCC Part 90 (for 2.4 GHz)
Durability:	IP67 rating for ingress of dust and water. Dropped 3 consecutive times onto concrete from 1,22 metres [4"] at any angle with no operational defaults [transmitter attached to TIC]. Same vibration, heat and flame performance as the TIC. See section 1 – environmental requirements for details

17. Receiver Station for Optional Wireless Video Transmission

Installation:	Wheeled carry case incorporation all necessary equipment for receiving the transmitted images from the TIC. Available with or without integrated LCD panel display
Dimensions:	Case approx. 645 x 520 x 260 mm
Weight [complete]:	Approx. 17,5 Kg [case with LCD-Display] Approx. 15 Kg [case without LCD-Display]
Channels:	2 user selectable channels in 2.1 GHz and 2.4 GHz band, subject to local regulation
Display Size [Option]:	12" LCD-Display
Power Supply:	110V / 230V AC, Cold equipment socket 12V / 24V DC Motor vehicle standard socket
Antenna:	Yield 18dB, vertically polarised
Video output:	NTSC video output for external monitor / VCR etc, via BNC male connector Case with LCD-Monitor with internal NTSC to PAL conversion and PAL video output for external monitor / VCR etc. via BNC male connector
Approvals:	EMC, EN 61000-6-3 and EN 61000-6-2, Directive 72/245/EEC for electric / electronic sub-assemblies for vehicles valid with the latest amendments (CE, E1) [e1 024261]

Durability:	Case IP65, operational without damage after 1m drop
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A receiver station without case incorporation all necessary equipment for receiving the transmitted images from the TIC is available without LCD as well.

18. Optional Video Recorder

Installation:	Stand-alone Video Capture module to be attached / detached from the TIC by the user without use of tools. May be included at time of purchase or added to any base camera without modification.
Storage medium:	RS MMC 512 MB [reduced size multi media card]
File format:	mpeg 1
Recording Capacity	approx. 2 hours
Power Supply:	1 x Lithium Ion battery [same as TIC battery]
Operating Time:	> 5 hours, from 1 fully charged battery
Weight:	approx. < 400 g
Approvals:	EMC: EN 61000-6-3 and EN 61000-6-2 / FCC Part 15
Durability:	IP67 rating for ingress of dust and water. Dropped 3 consecutive times onto concrete from 1,22 metres [4"] at any angle with no operational defaults [video capture attached to TIC]. Same vibration, heat and flame performance as the TIC. See section 1 – environmental requirements for details.

19. Permanent Power Supply

Functionality:	The optional permanent power supply will power the TIC continuously. It can be used fix mounted i.e. on vehicles for smoke navigation or in training galleries. The permanent power supply will draw approximately 1.5 amps of power.
Power Supply:	11 – 16 V DC



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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